FVCINA DI MARTE

25

Fortification and Siegecraft

Edited by

JEREMY BLACK

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L'expérience historique a favorisé la prise de conscience théorique. La raison, effectivement, ne s'exerce pas dans le vide, elle travaille toujours sur une matière, mais Clausewitz distingue, sans les opposer, la conceptualisation et le raisonnement d'une part, l'observation historique de l'autre.

R. Aron, *Penser la guerre*, 1976, I, p. 456

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ISBN: 979-12-985077-6-0

On the cover:

Henri-Paul Motte (1846-1922). *Richelieu on the Sea Wall of La Rochelle* (1881). Museum of Fine Arts, Boston. In the background, Father Joseph, born François Leclerc du Tremblay, the famous Eminence Grise, studies the technical aspects of the siege indicated by the military engineer.

Graphic design and realization: Antonio Nacca

Print: Nadir Media – Roma
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Fortification and Siegecraft

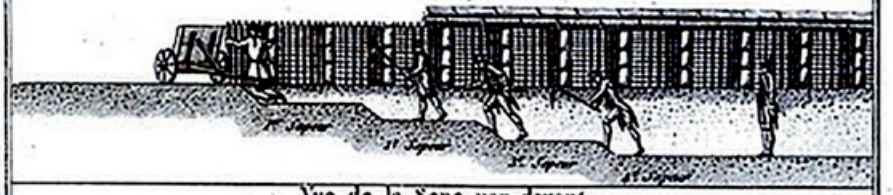
Edited by JEREMY BLACK

For Andrew McHallam

LES SAPES.

Plan d'une tête de Sape.

Vue de la Sape par derriere.



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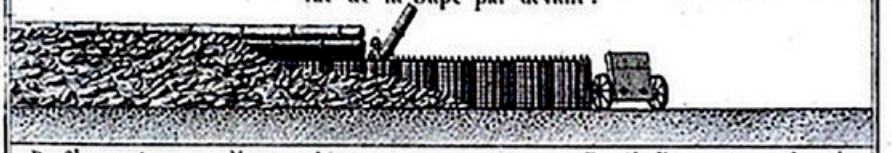
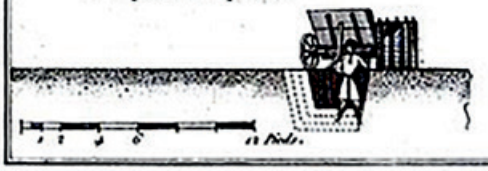


Profil représentant l'excavation des quatre Sapeurs.



Profil d'une Sape achevée.

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Preface

by Jeremy Black

Fortification has a longstanding and potent role in the collective imagination, one, centred on walls, that goes beyond the origin of towns. Concerned about his security on his desert island, Robinson Crusoe, in Daniel Defoe's novel of 1719, a period of justified invasion fears for his British audience, fortified his dwelling using the model of cannon on a ship:

> 'I thickened my wall to above ten foot thick, with continual bringing earth out of my cave, and laying it at the foot of the wall … and through the seven holes I contrived to plant the musquets, of which I took notice that I got seven on shore out of the ship; these, I say, I planted [them] like my cannon, and fitted them into frames that held them like a carriage, that so I could fire all the seven guns in two minutes time.'

This collection ranges widely in theme, time and space to offer a wide-ranging discussion explaining the role and development of both fortification and siegecraft. We engage therefore with the key methodological issues of 'whether it is methodologically sound to use modern patterns and paradigms', such as operational level actions, to evaluate the past. We also consider how best to move beyond simplistic accounts of 'evolution', in terms of 'the interaction of fortresses and siege technology', so as to produce 'a consistent and straight line' of improvability.[1]

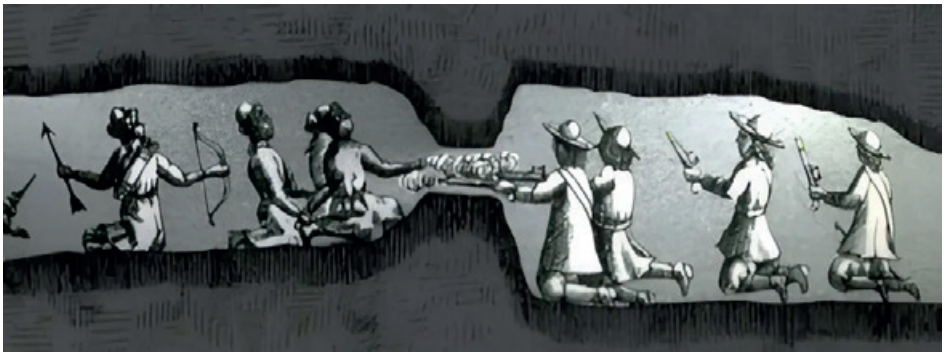
At the same time as these discussions, it is necessary at every moment to understand the casualties that could be entailed. In 1809, the British successfully bombarded the well-fortified and naturally strong Fort Desaix, the key position on the valuable French Caribbean colony of Martinique. One of the British shells detonated the principal magazine on 24 February, leading to the surrender of the devastated fortress later that day. Thomas Henry Browne recorded:

1 F. Echeverría, 'Ancient Sieges and Modern Perspectives', in J.W. Armstrong and M. Trundle (eds), *Brill's Companion to Sieges in the Ancient Mediterranean* (Leiden, 2019), p. 332.

> 'February 20th. Our batteries began their fire, which was truly tremendous, they threw 500 shells, besides quantities of round shot, in the course of the evening…. 25th…. The inside of the work presented a shocking spectacle of ruins, and blood, and half-buried bodies, and was literally ploughed up, by the shells we had thrown into it.'[2]

It is a great pleasure to acknowledge the support and help of Virgilio Ilari and, in doing so, mark his significance for developments more generally in military history, developments that are intellectual as well as institutional. I benefited from the comments of Ian Beckett, Pet Brown, Alexander Hill, Nika Khoperia, Stephen Morillo, Rick Schneid, Mark Stevens and Jason Warren on an earlier draft of all or some of my own contributions.

This book is dedicated to Andrew McHallam, with thanks for over a half-century of friendship.



Mine warfare during the siege of Canda, according to Johann Bernhard Scheither, military engineer from Brunswick and veteran of the siege (died after 1677).

2 R.N. Buckley (ed.), *The Napoleonic War Journal of Captain Thomas Henry Browne* (London, 1987), pp. 106-7.

Introduction

by Jeremy Black

Like the topic of this book, the contributions show a considerable range. This is necessarily the case whether the perspective is chronological, geographical or thematic. It is also necessarily the case whether conflict is treated at the geopolitical, strategic, operational or tactical levels. This characteristic of range and variety reflects the lasting, multifaceted, complex and protean nature of the subject, and of military history as a whole. It is one of situations and activities, structures and contingencies. As a result, this subject, this being both military history, and fortifications and siegecraft, cannot be readily reduced to a single conceptual, methodological or historiographical account. Attempts to do so, whether advanced in the form of 'praxis', paradigm or any other language, are highly misleading, as, therefore, are simplistic uses of metaphors such as revolution.

In part, this is because, aside from the key points of complexity and variety, such that reading from one form, or period or country, or combination thereof, to a more general conclusion, is in fact highly misleading, both fortification and, thereby necessarily, siegecraft are open to a number of definitions. At one level, there is the obvious approach, with fortifications seen as variants on famed walls, notably the Great Wall of China or Hadrian's Wall, and on medieval castellations. Many of the studies of fortifications centre on the constructions, but those disregard the broader perspectives and those that can be summarised in terms of their purposes, uses and consequences, whether practical or psychological.

In these practical and psychological terms, frontiers had differing means and contexts which greatly affected their defences. Jorit Wintjes' piece on the Early High (Middle) Roman Empire shows that the frontiers of the early and high Empire work as zones of control, and that frontier architecture is therefore designed for channelling movement, not static defence. He presents the Roman frontier

fortification as linear barriers, but ones that were not meant to be defended like city or fortress walls, but, rather, served to limit small-scale movement, and to prevent cattle rustling and the like.

In practice, frontier defence then and now in part, though very variously, works by the threat of projecting power beyond the frontiers. Therefore significant numbers of soldiers were and are stationed on the frontier and frontier architecture at least partly reflects the need to deploy forces rapidly beyond the frontier zone. Massing the Roman army on the frontiers had various long term-effects such as creating new political centres of gravity and leaving the civilizational footprints of the Roman army all along the frontiers of the Empire.

More generally, overlapping with purpose-built wall systems and cutting-edge individual fortresses, came walls, and earthen fortifications as allied systems. So also, as Florin Ardelean and Alexander Querengässer show, with improvised field fortifications and fortified camps. A good instance of the tactical and potential operational significance of the latter came with the Swedish inability in 1632 to drive the Imperialist forces under Wallenstein from a heavily-fortified position at the Alte Veste near Nuremberg. This was a major success for the combination of terrain, field entrenchments, and a well-directed defence. The Swedes lost heavily from desertion that owed much to supply problems in the devastated countryside.

'A camp is a battlefield that is occupied,' Frederick the Great (II) of Prussia (r. 1740-86) declared. Fortified camps played a significant role in the military history of the early modern period. Nevertheless, the Danish camp at Segeberg (1700), the Saxon camp at Pirna (1756), or Frederick's camp at Bunzelwitz (1761) are less well-known than the battles of Narva (1700), Lobositz (1756), or Torgau (1760). This is because, in the Prussian king's view, fortified camps were indeed prepared battlefields where an army awaited an enemy attack from artificially secured positions. However, the enemy was rarely willing to take the increased risk associated with such an attack. Nevertheless, these camps could serve significant operational purposes if their location was well-chosen. If this was not the case, they could, however, quickly become a trap for one's own troops, as demonstrated by the Russian defeat by the Ottomans (Turks) at the Prut (1711) or the British defeat by American-French forces at Yorktown (1781).

Alongside variations in the structure of fortifications came those in their organisation. Thus, in 1864, General William Sherman ordered his subordinates to construct their defences not as long lines but round a series of fortified places.[1] This preference was also to be seen with the Germans in World War One, and notably so by 1917.

The effort involved in fortification could be far more formidable. Most famously this is so with China and the Romans. However, wall systems were far more widespread. Thus, the *Danevirke* in southern Denmark (now in northern Germany), begun in about 650 CE but maybe earlier, may well have involved the movement of 80,000 cubic metres of soil and gravel and taken about 30,000 trees. As with the Great Wall of China, the *Danevirke* went through several distinct stages, a process, illuminated by carbon-14 dating, that continued into the twelfth century, but did not stop the Emperor Otto II from successfully invading Denmark in 974-5.

In turn, siegecraft is considered in this collection from catapults and trebuchets to artillery. Yet, in practice, there is no such ready delimitation or definitions of either fortification or siegecraft, as this volume makes clear. Furthermore, within both fortification and siegecraft, there was often the combination of several means, and it can be very difficult to establish primacy. Thus, in Sulla's successful siege of Pompeii in 89 BCE the privations of blockade played a role, but there was also probably the impact of the polybolos, a repeating catapult of Greek design that fired metal-tipped projectiles. This was an anti-personnel weapon rather than one intended to destroy the 40 foot walls.[2]

This point is taken further if we consider another perspective: not just the range of fortification and siege activities across space at a particular time but

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1 I have benefited greatly from the advice of Pete Brown, Lothar Höbelt, Virgilio Iliari, André Murteira, Kevin Passmore, Alexander Querengässer, Kahraman Sakul, Ulf Sundberg and Jason Warren on an earlier draft, and from discussing the subject with Stephen Morillo and Keith Maclay.
B.H. Reid, *The Scourge of War. The Life of William Tecumseh Sherman* (New York, 2020), p. 283.

2 A. Rossi, 'Pompeii: From the Survey of Ballistic Impacts Towards the Reconstructions of Roman Artillery,' https://doi.org/10.3390/engproc2025096001, *Engineering Proceedings*, 91, 1 (2025), pp. 1-21; A. Rossi et al, 'From Pompeii to Rhods, from Survey to Sources: The Use of Polybolos,' *Heritage* (2026): DOI:10.3390/heritage9030096.

also that across time at specific sites. This can be demonstrated for example in the case of Genoa and linked, there and elsewhere, to particular tasks. The most obvious was the defence of the city against siege, as in 1495, 1522, 1747, 1800, and 1814. This need ensured progressive expansions to the walls, and notably so beyond the built-up area to a degree that was unusual. These expansions were a key element of fortifications, namely their time-limited character or, at least, apparent effectiveness and certainly cutting-edge validity, in the face of changes in purpose as well as weaponry, defensive and offensive, and fortress design.

There was, moreover, as with so many other defended cities, also conflict within Genoa, conflict that led to the construction of towers, as seen for example also with other surviving examples in Italy including the towns of Bologna and San Gimignano. In the latter, there were 72 tower houses at the end of the Middle Ages, of which 14 survive. There and elsewhere, such tower houses were different to the surviving towers on city walls, which were classically to protect gateways. Such Italian tower houses served, instead, for assertion and protection, both lasting characteristics of fortifications, and an aspect of the overlap of social and military functions.

To a degree, we are talking about defensive and offensive positional warfare. The former is a product of the inherent human need for shelter and protection, a matter that can in part be probed in terms of anthropological, sociological, collective psychological, and archaeological insights; and the latter that for attacking and exploiting this need. What, however, are discussed in terms of these drives has varied and, in part, this explains changes in the vocabulary and content of the discussion of the subject, which indeed goes back to Antiquity. Siege thus is a form of battle, a clash between two opponents, but one linked to a fixed position, and therefore inherently involving attacker and defender, at least as far as that position is concerned, although with a very different clarity if relief-forces become part of the equation, as famously in many sieges, for example that of Alesia by Julius Caesar in 52 BCE culminating in the Gallic Wars.

Yet, it is unclear how far this distinction works and/or is applied if the scale is that of an attack on a number of such positions. Such attacks are more likely to be referred to as battles rather than sieges; although Verdun on the Western Front in 1916 has been referred to as both. So also with Stalingrad in 1942-3 and Dien Bien Phu in 1954. Moreover, that terminological conflation has been read back

into past episodes such as Vienna in 1683, although, for that, Austrian scholars distinguish between the siege of Vienna and the battle of the Kahlenberg. Siege and battle, more generally, are sometimes almost casually interworked as in 'siege of Rome' and 'battle for Rome' with reference to 1944.[3] In June 1940, the Maginot Line was the scene of an encirclement battle for which it was not prepared. The French army expected a frontal attack and planned to counter breakthroughs with mobile reserves. In the event, the Germans approached the fortifications from all sides, and the rear proved vulnerable.

As a reminder that the subject benefits from being considered from more than one perspective, the Ottoman side of siegecraft in the late seventeenth century is assessed in this collection by Kahraman Sakul. Instead of any Ottoman-Western dichotomy in military developments, he sees a military culture in which there are similarities as well as differences. That offers one way to assess 1683 in context.

Aside from historic consideration of the subject (that in the past), there is also historical discussion (that on earlier periods, whether occurring in historic or contemporary terms). Indeed, changes in fortification have played a major role in the consideration more generally of developments in warfare. Yet, continuity should also be part of both contextualisation and analysis. Thus, alongside the emphasis on Roman forts and walls, medieval castles,[4] Renaissance 'new-style' fortresses, and Vauban-linked fortification,[5] and the relevant siegecraft in each case, comes the need to consider other factors in campaigning. These include the salience of the battlefield (which is one way to look at a siege), and the related tactics of shock and firepower (each important in sieges), as well as the operational significance of advances (and defensive moves) that did not relate to fortifications. These included the search for battle, the seizure of territory, raids, and amphibious operations.

There are also more specific arguments for continuity across established chronological divides, for example of siege-warfare capability into and during

3 D. Porch, review of J. Holland, *Cassino '44: The Brutal Battle for Rome* (London, 2024) in *Journal of Military History*, 89 (2025), p. 789.

4 See valuably recently, R. Ellenblum, *Crusader Castles and Modern Histories* (Cambridge, 2007).

5 J. Ostwald, *Vauban under Siege: Engineering Efficiency and Martial Vigor in the War of the Spanish Succession* (Leiden, 2007).

the early medieval period.[6] In the chapter on the Lazic War (541-62), Nika Khoperia argues that the sieges of Petra and Archaeopolis show the contemporary range and siege warfare, including prolonged siege activities to starve the garrison (a timeless tactic), tunnelling and sapping, and storming the walls with ladders. Petra was strategically significant for both the logistics of the Sassanian attackers and for the Byzantine defenders seeking to maintain their power and influence.

Power and influence are also significant in John France's piece. He argues that the ruins of castles reflect a divided society in which the rich retained military power as a guarantee of their solid and political dominance.

So also subsequently for both military continuity and socio-political factors, both in responses to gunpowder weaponry and, more specifically, most notably with reference to the supposed Early-Modern Military Revolution.[7] That thesis argued for a revolutionary change in fortification in response to the use of artillery with a consequent need for larger armies. Defensive fortifications changed but so also did the nature of siegecraft. Fortifications were designed by Renaissance-era governments to prevent short and decisive warfare and, in turn, made necessary a focusing on infantry, firepower and the resources and organisation to support both.

There were certainly radically new fortresses, as recorded for example in Andries Beeckmann's 1661 painting 'The Castle of Batavia', which depicted novel Dutch power in what is now Djakarta, and as can still be seen, for example at Civitavecchia near Rome. However, in practice, aside from such fortresses, there were also significant precursors,[8] as well as additions of new structures

6 L. Petersen, *Siege Warfare and Military Organization in the Successor States, 400-800 AD* (Leiden, 2013). See, on a longer timescale, M. Eisenberg and R. Khamisy ed., *The Art of Siege Warfare and Military Architecture from the Classical World to the Middle Ages* (Oxford, 2021).

7 Originally gunpowder-driven change was presented more widely than in and by Europe, and this theme has continued: see, for example R.M. Eaton and P.B. Wagoner, 'Warfare on the Deccan Plateau, 1450-1600: A Military Revolution in Early Modern India?,' *Journal of World History*, 25 (2014), 5-50; C. Zheng, 'The Introduction of European Fortification in the Late Ming Period,' *Chinese Annals of History of Science and Technology*, 1 (2017), pp. 18-70. For a more usual geography of concern, B. Lenman (ed.), *Military Engineers and the Development of the Early-Modern European State* (Dundee, 2013).

8 K. DeVries, 'Facing the New Technology: Gunpowder Defenses in Military Architecture be-

and forms to old ones, as depicted in Tintoretto's painting 'The Procurator and Knight Paolo Tiepolo' (c. 1578). This was a long accustomed practice with fortifications.

In early-modern Europe (as in other places and periods), there were not only new works but also transitional forms, incomplete adoption of the revolutionary model (in part due to reasons of cost, a factor also seen with church-building), and other elements explaining (and in some cases constraining or qualified) change. Designers of Western Eurasian sixteenth- and seventeenth-century fortresses were not bound to the stereotypical, late fifteenth-century Northern Italian pentagonal low-walled fortress; although Italian architects and engineers had an impact elsewhere, including in Transylvania, as Florin Ardelean discusses in his contribution, in which he shows that this relatively poor state still spent a large amount on fortification. So also with the cost to Siena of fortifications in the early sixteenth century.[9]

There was also the issue of adaptation to the particular requirements of environments, physical and military, as with the Portuguese in Morocco.[10] Similarly, Peter Brown's article focuses on seventeenth-century coastal Poland and Brazil, as well as Muscovy and Ukraine. Similarities and differences in geographical vulnerabilities, topography, governmental practices, manpower, material resources, perceived threats, learning and policies, all intersected to produce varied outcomes. This provides Brown with an opportunity to gauge these polities' receptivity to seventeenth-century European fortification ideas and achievements.

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fore the Trace Italienne, 1350-1500,' in B.D. Steele and T. Dorland (eds), *The Heirs of Archimedes. Science and the Art of War through the Age of Enlightenment* (Cambridge, Mass., 2005), pp. 27-72. For an emphasis on continuity, P. Purton, *A History of the Early Medieval Siege, c.450-1200* (Woodbridge, 2010) and *A History of the Late Medieval Siege, 1200-1500* (Woodbridge, 2010). This emphasis has to confront claims for major changes due to the spread of counterweight trebuchets.

9 S. Pepper and N. Adams, *Firearms and Fortifications: Military Architecture and Siege Warfare in Sixteenth-Century Siena* (Chicago, 1986).

10 M.M. Ebl, 'Portuguese Urban Fortifications in Morocco: Borrowing, Adaptation, and Innovation along a Military Frontier,' in J. Tracy (ed.), *City Walls: The Urban Enceinte in Global Perspective* (Cambridge, 2000, pp. 349-85; and G. van der Tier and T. Mostert, '"Lest it be conquered by the wind": The early evolution of VOC Fortifications on Dutch Formosa, c.1620-1650,' *Journal of Military History*, 89 (2025), pp. 281-306.

In practice adaptation to environment was far from an automatic, quasi-Darwinian, process. There were standardised designs in plans, but issues from adaptation arose not only from technical challenges during construction but also as a consequence of particular ideas and interests linked to specific forms.

For the fifteenth and sixteenth centuries, as later for the seventeenth and eighteenth, aside from the particular commitments posed by the variations offered by individual sites, medieval recidivism, constructors' brainstorms, more advanced trigonometric understanding, and deeper comprehension of the potential of particular gunpowders and projectiles, interacted to produce a plethora of fortress-designs, and in a variety of ways.[11] Medieval recidivism included round towers and rounded bastions, square-shaped and rectangular-shaped external walls, which were constructed at right angles in relation to each other, and high walls. The idea of redundancy for these was not always apparent, not least on particular sites.

This analysis can be amplified if non-Western practices are brought into consideration, for example those (differently) in China, India, and Japan. Improved defensive facilities included widespread ones, notably platforms for shooting, as with *tamons*, galley-like buildings built on existing ramparts, and *Yagura*, turrets with wide firing arcs, from the late sixteenth century, both still seen in Edo Castle; but also more specific elements. Thus, constructed in 1607-11, the tower at the new Matsue Castle in Japan employed a combination of two construction methods: through-pillar alteration, employing an alternating and balance pattern of pillars passing through two floors, and the installation of horizontal beams transmitting the load from upper floors rather than imposing it directly on the pillars of the lower floors.

Japanese castles continued to have a value in late nineteenth-century civil warfare, notably the Satsuma rebellion when in 1877 Satsuma forces failed, in a siege lasting over fifty days, to capture Kumamoto Castle, the defences of which had been hastily improved.

More generally, stone fortresses posed a deterrent value. They also sucked in a disproportionate amount of the opposing forces, thereby freeing up the de-

11 Pl Luengo (ed.), *Trazas de poder: Ingenieros entre palacios y fortificaciones, 1746-1808* (Madrid, 2006).

fenders' units for manoeuvre and attack elsewhere. Yet, a major assault and, even more, a prolonged siege, could, and often did, divert the defenders' forces to come to the aid of their fortress and thereby abandon or weaken plans for operations elsewhere. Separately, governments, both the attacker and the defender, expected a fortress's armed and civilian population to tolerate extended suffering and subscribed to attritional warfare and therefore a contest of wills. This suffering on the part of the defender would, it was expected, lead the attacker to desist eventually.

As John France notes, in a world where fighting was essentially man-to-man, the defender of even the most limited fortification had a huge advantage which was only limited (but not terminated) by the development, with gunpowder, of effective missile weapons. Fortifications represented planning, an understanding of possibilities, preparation, and cost, the last most clearly in stored-up labour power and material cost (notably wood, stone and concrete, and the labour and other costs of providing and using them), and, therefore, wealth. For example, the fiscal strength of the Maginot Line was meant to economise resources for mobile strength. In fact, there was no such economy in this case.

In turn, fortifications also served to protect this wealth as well as the wealth of society, from animals and people to, for example, wampum: cylindrical beads used as items of value by Native Americans in New England.

Presenting fortifications this way, whether fortresses, walls or entrenchments, helps explain the advantage of defences, notably in terms of the built settings of planned conflict: the defence could accumulate labour power and deploy the resources of society over a significant period of time, and as a consequence of the sustained use of government power. This was necessary given the restricted resources and limited surpluses of pre-industrial societies. For example, the rammed-earth wall that enclosed 280 hectares of Taosi, a major settlement on the Longshan culture of Late Neolithic China (2300-1900 BC), would have required much manpower.

Thus, faced with an immediate threat, the wealthy state of Venice was able to build impressive fortifications at Nicosia in 1567, whereas in independent but poorer Lucca, although the need to modernise the medieval walls was recognised in 1496, construction did not begin until 1544 due to delays including costs, the availability of resources, and the clearing of outlying villages. The last

was an aspect of the broader imprint of the more generally disruptive character of fortification which was even more the case when fortified zones were large.

At the same time, labour was not only accumulated but also more immediately required, alongside troops, in defending a position. Labourers could cover a multitude of sources, including townspeople, slaves, people conscripted for specific tasks, such as miners, troops, and, as with the Maginot Line, immigrant workers. Repairing damage to the fortifications, transporting stores and supplies, helping to remove casualties, and moving artillery pieces, were all time-consuming and physically-demanding jobs. If left solely to garrison troops, these jobs could severely limit the number available for 'manning the walls'. In addition, mining and counter-mining involved significant numbers of labourers.

In contrast to the accumulated and continuing defensive labour provision, attackers were obliged to deploy force to bring down structures in a very short timeframe. In this context, the sources of destructive power available to pre-industrial societies were of only limited assistance while the shock of assault could be lessened by the strength of fortifications and garrisons.[12] Yet, that shock only needed to be successful at one point for the fortifications to be breached, a process that could start off what in effect was a type of battle fought in, and from, such breaches. Such battle components tended to attract the celebratory attention of contemporaries as firepower did not appear heroic or exemplary. The siege of Troy was commemorated in terms of individual combat, while, in 1940, the Germans depicted the fall of the Maginot Line in 1940 as the triumph of highly-motivated German soldiers over French technology.

In his chapter, Alessandro Carli looks at the economics of siegecraft in the context of the poverty of Ancient Greece. He argues that, during the classical period, only Athens could regularly afford large-scale siege operations and, separately, that costs in casualties were too high for the small-population cities to afford direct assaults. As a result, besiegers focused on circumvallation lines in order to induce famine and on traitors within. In contrast, under Alexander the Great and his successors there were larger-scale sieges and assaults, these reflecting greater resources in money and manpower.

12 S. Morillo, *War and Conflict in the Middle Ages: A Global Perspective* (Cambridge, 2022), pp. 110-18.

To a degree, gunpowder was to challenge, at least in a limited way, established equations of offensive and defensive strength for fortresses and walls, varied as the understanding and applications of those equations could be. Gunpowder did so by extending the range and easing the concentration of effort, as well as by providing an advantage for the offensive, both in potency and in time-sequencing. However, the Western Front in World War One (1914-18) showed also that labour power, in the form of entrenchment (but also, for example, concrete structures) could go a long way to neutralise the massive and unprecedented amounts of firepower then available for the offensive.

However, that accumulated labour power had to be supported by firepower, including counter-battery fire, and the use of reserves to support the defence. As is usually the case with fortification, the prospect of rapid relief affected the scale of fortification judged necessary.[13]

At the same time, odds change because the offence can choose where to attack, and that is also a varying situation. In terms of the attack, the density of defences is a major constraint, a density both in structures and in troops. As a result, fortifications were less effective on the Eastern Front in World War One than on its more compressed and densely defended Western counterpart. Similar geographical variations in historical outcome and, to a degree, scholarly coverage, can be seen in Alexander Mikaberidze's piece on the Napoleonic Wars which also argues a point of more general relevance, namely that a focus on the Napoleonic 'quest for the decisive battle' tends to ignore the degree to which, notably in Southern and Eastern Europe, conflict was still shaped by siege warfare. The underrating of fortresses in contrast to battles also has parallels in sea warfare.

Analysis of fortification and siegecraft in terms of labour power is valuable, but it alone is far from a fixed context. With labour, there have been, and will continue to be, major variations in both space and time, and that was an aspect of the notions of socio-military development seen in Adam Smith's *The Wealth of Nations* (1776). Changes across space owe much to variations in the availability, cost, convenience, and malleability of labour. These variations reflected

13 W. Lee, 'To Stop a Cannonball: Ottoman Fortress Design and Comparing Military Revolutions, 1350-1730,' in M.C. Fissel (ed.), *The Military Revolution and Revolutions in Military Affairs* (Boston, 2023): 113-76.

demographic, economic, social (including gender), legal and political criteria. Politics, not least those of coerced labour, provides a crucial element of the environment, and serve as a reminder of the importance of human geography as opposed to its physical counterpart. Conscription is an aspect of a coerced labour market.

In turn, these criteria were affected by demand considerations for fortification, including the type and scale of construction required, the particular nature of the local physical environment and its relationship to wider geographical context,[14] and the degree of local political opposition. For example, in the 2020s, China devoted considerable effort to building up islands in the South China Sea, such as Antelope Reef in the Paracel Islands in 2026, and equipping them with airfields and missile bases. Large numbers of dredgers were used to help construct what has been referred to as the Great Wall of Sand, with sand and mud moved from the seabed to build up the islands, including Woody Island in the Paracels. Malaysia, the Philippines, Taiwan, and, in particular, Vietnam have also all followed the same policy in the South China Sea. These island bases exemplify a more general issue in fortification, namely the extent to which the works primarily express an offensive purpose or a defensive one. Circumstances can change greatly in the respect, as they did with the Crusades, with a move to clear defensive purposes in the mid-late twelfth century. The circumstances can also relate to developments in combat and construction capabilities. Technological changes in construction methods re-created the nature and constraints of criteria, not least in terms of requirements for building material, expertise in construction, and garrisoning - with troops, weapons, munitions and food - for defence.

Linked to these and other criteria, issues of prioritisation and planning emerged, not least in terms of strategy. Prioritisation is a matter not just of the location of fortifications, a key subject, but also of the strength sought. This is both fixed strength, in the sense of the construction, and 'mobile' strength, in the sense of garrison size and type, and weaponry. The maintenance of fortifications is crucial. To that end, prioritisation and planning involve labour power but as an aspect of a more general allocation of resources.

14 P. Nath, 'Looking Beyond the Military Revolution: Variations in Early Modern Warfare and the Mughal Case,' *Journal of Military History*, 86 (2022): 9-31.

Moreover, prioritisation changes with time, both in the long term and with reference to the real or apparent threat before and during particular campaign seasons. A classic instance was the movement of artillery between fortresses and, similarly, their provision for particular sieges or assaults.[15] The location of artillery by Britain to protect Singapore against Japanese attack was an instance, as the anticipated naval threat did not arise in 1941-2.

The discussion of a supposed Early-Modern Military Revolution is in part an aspect of the chronological ordering of the subject, one related to questions of technology, scale and purpose, with these contexts and contents varied, and open to differing interpretations, in their interrelationships, causalities and consequences, and with regard to the relevant prioritisation.[16] So also, more generally, with the analysis of the context for fortifications.

For example, it has been argued that, in the nineteenth century, the increased scale of armies lessened the relative importance of fortifications, but it is not clear how best to present and analyse a relevant data set, let alone a comprehensive one. It may be necessary to distinguish between old fortresses that were less relevant in tactical, operational or strategic terms, and more modern ones that had greater relevance. Thus, the old fortresses guarding rivers were in the nineteenth century circumvented by railways.

In addition, many conflicts including the Crimean War of 1854-6, the American Civil War of 1861-5, the Franco-Prussian War of 1870-1, the Russo-Turkish War of 1877-8, the Boer War of 1899-1902, and the Russo-Japanese War of 1904-5, scarcely support this analysis of lessened importance for fortifications. For these wars, the sieges of Sevastopol, Vicksburg, Petersburg, Strasbourg, Paris, Plevna, Kars, Mafeking, Ladysmith and Port Arthur were particularly significant. Similar points can be offered for other periods.

In the late nineteenth century, there was more standardisation in fortification than had been the case during the early-modern period. This was particularly apparent in Japan. Thus, in Hakodate, a Western-style pentagonal star shape fort was designed by Takeda Ayasburo, a Japanese expert in Dutch studies, and built

15 Thomas Robinson, British envoy in Vienna, to William, Lord Harrington, Secretary of State for the Northern Department, 20 July 1735, London, National Archives, State Papers 80/116.

16 For a recent work of more general interest, C. Wickremesekera, *A Modest Arsenal: Gunpowder Weapons in Sri Lanka, 1500-1820* (Colombo, 2024).

in 1857-64. This was intended as a base for the Government of Hokkaido and as a response to Russian expansionism.

The siege of Port Arthur (1904–1905), the subject of Rotem Kowner's chapter, was one of the most consequential and widely observed military events of the early twentieth century. Combining a prolonged naval blockade with an intense land siege, it lasted nearly eleven months and played a decisive role in shaping the outcome of the Russo-Japanese War. Japan's victory symbolized the first modern defeat of a European empire by an Asian power and reverberated worldwide. It also helped destabilize the Russian Empire, contributing to the Revolution of 1905. The siege was also part of a victorious sequence. The fortress's fall in January 1905 released nearly 100,000 Japanese troops, whose redeployment facilitated Japan's victory at Mukden and secured its dominance in Manchuria. Militarily, the campaign revealed the transformative impact of heavy artillery, modern communications, and systematic siegecraft, while exposing the limits of traditional fortifications. It underscored the importance of logistics, joint naval-land operations, and control of key terrain such as 203 Metre Hill. In many respects, the siege foreshadowed the industrialized, attritional warfare that would characterise World War One. On the other hand, sieges had a 'trap' aspect that was different to that of this attritional warfare, not least because sieges could end in a total surrender.

The symbolism of the fortress plays a role as a force-in-being and representation of power that had to be reckoned with. There, the extensive visual and literary description, or even just casual mention, including by analogy and metaphor (for example in love literature), of fortifications tended to emphasize their scale and potency, and this emphasis has been sustained in the subsequent literature. There was certainly much effort and expense devoted to fortification,[17] not least because tactically (and therefore operationally and strategically) they were most effective if they could provide both defence in depth and cross-fire positions. It is the largest ones that tend to survive and that can be most readily seen in whole or part, as they are the most likely to have been preserved and adapted. This, however, can be misleading.

17 See, recently, P. Luengo and G. Smith (eds), *A Fortified Sea: The Defence of the Caribbean in the Eighteenth Century* (Tuscaloosa, Al., 2024).

Separately, for very many settings, the use of the languages of fortification and siege are widespread, and not only for conflict. Political theory and, separately, fiction, for example, could use the vocabulary.[18] The town was defined by its walls and its position and liberties were represented in them and defended by them. So also with public rhetoric, as in the phrase of a community 'under siege'. The use of the term sapping is particularly instructive. Individual health is also presented in a similar fashion as in the discussion of the attacks of cancers on cells.

This situation can be an aspect not only of the role of metaphor, but also of the relationship between 'classic' fortification/siegecraft and those linked to religious, cultural, social and political criteria. The relationship here is not one of fortified religious sites, as for example in Japan in the sixteenth and early seventeenth centuries,[19] but, rather, the very idea of religion as a fortification against hostile forces, both diabolical elements and the challenges from rival religions. This idea affects the more general cultural assessment of defence.

Fortifications and sieges also played a major role in both news and public memory,[20] not least because the resolve shown in resisting siege could be seen as exemplary as with the successful French resistance at Belfort in 1870-1 during the Franco-Prussian War. This led to the Lion of Belfort statue in Belfort, with copies in Paris and Montreal, while the commander, Colonel Pierre Philippe Denfert-Rochereau, was elected to the National Assembly and much celebrated across France in the naming of streets and squares. Soon after, Osman Pasha, the defender of Plevna in 1877, became a trusted figure under Abdulhamid II while his reputation was underlined in social memory, not least with a song commemorating his deeds in the siege. Although he was defeated and captured by the Russians, he became a national hero in his lifetime which was highly unusual in Ottoman history. Songs were written for him.

18 J.E. Dejean, *Literary Fortifications: Rousseau, Laclos, Sade* (Princeton, N.J., 1984).

19 There were also castles under the control of powerful clerics, for example the building of Dover Castle by Odo, Bishop of Bayeux as Earl of Kent, and the castles controlled by Henry, Bishop of Winchester during the civil warfare of the reign of King Stephen (1135-54).

20 E. Swart, 'Defeat, Honour and the News: The Case of the Fall of Breda (1625) and the Dutch Republic,' *European History Quarterly*, 46 (2016), pp. 6-26.

Particular sieges had a distinctive role, politically, culturally,[21] and notably so for urban communities such as Lille, where the resistance to Austrian attack in 1792 and German in 1940 were/are seen as heroic. Commemorations, for example of the resistance of Taunton to Royalist siege in 1644-5 in the English Civil War, kept these memories alive. Such sieges and fortifications play a role in the wider question of legitimacy, as with Joan of Arc's success in relieving Orleans in 1429, and also with claiming continuity with an exemplary past, for example in Japan in the late nineteenth century. Substantial fortifications could be a source of pride and a visible symbol of status and autonomy. It was therefore understandable that, after a successful siege, the victor often chose to demolish the walls.

Contested memories continue to the present. The Irish film *The Siege of Jadotville* (2016) related to a brave perimeter defence by a Irish unit in the Congolese civil war to a much larger Katangese attack. The battle was largely ignored in Ireland, possibly because the defenders surrendered, but a government review in 2004 was followed by a far more positive account to which the film contributed.

Linked to the commemorative role can come cultural points, as with neo-Gothicism from the late eighteenth century, a style that focused on fortifications, and more particularly in the nineteenth. This was given further normative strength by royal patronage, as with the Hohenzollern dynasty of Prussia, for example in the case of Rheinstein Castle, purchased by Prince Frederick of Prussia in 1823 and then restored. There was also a widespread use of castellation for decoration, as with gateways to estates, the entrances to railway tunnels and bridges, for example that completed in 1868 crossing the River Mersey at Runcorn, and with the front of railway stations.

There was no comparison, later, in the case of subsequent road systems or airports. Instead, the cultural idea was preserved most strongly in imaginative fiction, as in J.R.R. Tolkien's very well-selling epic *The Lord of the Rings* (1954-5), notably *The Two Towers* (1954) and in Mervyn Peake's Gormenghast trilogy (1946-59) which is dominated by the extensive, but mostly deserted, Castle Gormenghast.

21 P. Arblaster, *The Siege of Breda, 1624-25: Herman Hugo's First-Hand Account* (London, 2026); A. Fischer-Kattner and J. Ostwald (eds), *The World of the Siege: Representations of Early Modern Positional Warfare* (Leiden, 2019).

Separately, the castle as site and symbol of oppression, notably of prisoners, was particularly important in political and cultural iconography, and ensured an overlap of fortifications and prisons. This was seen for example in opera, as in Beethoven's *Fidelio* (1805) and Puccini's *Tosca* (1900), and in literature, as in Dumas's *Count of Monte Cristo* (1846) and *Man in the Iron Mask* (1850). This idea intersected with the strategic understanding and appreciation of fortifications in ideological and political terms.

Here the key point is that there is no obvious approach to the non-functional valuation of fortification, and, indeed, that ideological approaches affect the very view of functional considerations. For example, political movements opposed to large standing forces on the part of the government, because they regard them as inherently supportive of authoritarian possibilities, were and are likely to oppose the idea of fortifications. This is notably because of the anxiety that they could be used to overawe domestic opposition. That is combined with a determination to prevent others from having fortifications. In the seventeenth century, for example in France and Hungary, absolutist regimes demolished town walls as well as castles, and the same process was seen during and after the English Civil War.

Symbolism worked in many ways. The Seven Towers in Istanbul served as the place of incarceration for European diplomats in time of war and, thereby, a symbol of Oriental oppression. The legend that the city would be captured by the king of the Yellow Race, who would enter through the Golden Gate at the Seven Towers may have led Mehmed II to wall up the gate.

Differently, in his chapter, Kevin Passmore shows from an architectural perspective, that the Maginot Line was an eclectic blend of neoclassicism and modernism, neither of which were entirely immune from sensitivity to regional variation. But the objective of this article is not simply to list the 'influences' on the aesthetic of the fortifications. It has asked what was at stake in the use of particular aesthetics, and how, through conflict and negotiation of technical challenges during planning and construction, the fortifications became something aesthetically new, which nobody had entirely intended or foreseen. They were a symbol of state power, constructed in a region with a long history of using military and civil architecture to express state power, from Vauban's forts to Strasbourg and Metz railway stations and the Palais du Gouverneur in Metz,

constructed under the German annexation. However, as it was constructed, officers with different conceptions of the art of war contested the engineers' hubristic plans. Then, the troops who occupied them humanised with the fashionable rural aesthetic, thus accentuating their eclecticism. The Maginot Line was made from below as well as from above.

There was also the politics of success and failure in siegecraft and defence, a theme discussed by Ethan Rafuse in his consideration of Grant's purposes and methods in the operations against Petersburg in 1864.

Separately, even if simply in terms of warfare, there is the need to consider the naval dimension, not least with blockade and bombardment. These were both part of the repertoire of siege and assault by warships. If convoy is correspondingly that for fortification, so possibly should be ship defences, from armour to artillery, as well as the fighting crew that act as a garrison for ship. Fortifications were also built on land in response to the challenge posed by invasion threats and their capacity to 'fix' the resources of defending powers. Fortifications in this context could be a force-multiplier.

This was true not only of coastal fortifications against attackers, but also those of naval bases,[22] for example German U-boat bunkers in French ports as well as the defences of the ports themselves. So also with the defences of Iranian positions near the Strait of Hormuz in 2026. Indeed, the latter exemplified the multi-factual nature of fortification and siegecraft, with the blockade of the Strait by Iran a form of siege that was also a defence against the attack on Iran.

There have also been overlaps between land and sea fortifications in the shape of ideas and expertise, as with the likening of the Maginot Line forts to sunken battleships and the role of naval officers in designing their systems of manning and gunnery.

Air power had taken the complexities of fortification and siegecraft further, adding at sea the fortifications of strengthened decks, anti-aircraft missile guns and covering aircraft, and on land much of the capability of air warfare. This could and can include the use of pre-emptive attacks on hostile air and missile bases. Giorgio Scotoni contributes to an understanding of the role of air power

22 A. Lambert, *No More Napoleons. How Britain Managed Europe from Waterloo to World War One* (New Haven, Conn., 2025), pp. 177-204.

in siegecraft on the Eastern Front in World War Two. The initial Soviet strategy relied on all-out resistance: defending encircled positions to the last man in order to enable the Red Army to reorganise the Front. Air power provided the Germans with mobile artillery, to hit positions under siege, for example Leningrad, Moscow and Stalingrad; as well, conversely, as to support them, notably the German forces encircled at Demjansk and Stalingrad. Because of the scale, the latter airlift represented an innovation in siegecraft. This was not least in the Soviet response, in terms of both air power and several rings of anti-aircraft guns.

As a result of such expansion, it is possible that the history of fortification and siegecraft becomes much of that of war. There has always been that context but it became more apparent with, and following, the entrenchments of World War One (1914-18). Certainly, and separately, complicating the analysis, there is no set ratio of significance or attention between field entrenchments and more major fortifications such as, in that war, Liège, Antwerp, Namur, Przemyśl and Erzurum, although all fell to attack. Fortified sites, as opposed to fortification, also played a major role in the war including British-held Kut Al Amara in Iraq which fell to Ottoman siege in 1916.

So also in terms of attention with the interwar period, which includes major fortifications, for example the Maginot Line, a crucial and expensive aspect of French defensive strategy that is ably discussed by Kevin Passmore. The Maginot Line indicates the multi-purpose nature of fortifications. Initially, it was designed to channel attacks from Germany on France, but it became a continuous barrier mixing permanent fortification and field defences. Psychologically, the Maginot Line was intended to impress both the Germans and the border population. There was considerable disagreement among French generals on whether fortifications were strong points or continuous lines, from tactical to strategic levels. Passmore suggests that the line was overmanned as a result of a lobby within the group linked to fortifications and he relates French strategy to the struggle between generals.[23] The Maginot Line vies with the British guns at Singapore and the cult of the battleship as prime instances of an alleged failure to confront reality and thereby to block the rise and initial successes of the Axis powers.

23 K. Passmore, *The Maginot Line* (New Haven, Conn., 2025).

To a considerable degree, contrasting narratives, chronologies and, therefore, analyses can be offered. In his book, Passmore notes that, whereas the Vichy leaders did not attribute the French defeat in 1940 to the Maginot Line, the Gaullists emphasised their leader's favour for mobility and linked the Line to defeatism. Under the French Fifth Republic created in 1958 by Charles de Gaulle, the Line was presented as a symbol of the failure of parliamentary government, whereas presidentialism, as developed by de Gaulle, was presented in terms of mobility and attacking.

Not only the French built elaborate and expensive fortifications in the inter-war period – Stalin's Soviet Union spent considerable sums on fortified districts constructed athwart probable lines of enemy attack.[24] Fortified positions, however, could fall rapidly as Armenian-held Kars did to Turkish attack in 1920.

World War Two also saw the further development and use of major fortified positions such as at Sevastopol and of doctrine or rhetoric accordingly, as with Hitler's employment of the idea of defensive 'hedgehogs', notably the *Feste Plätze* or *Festungen* that Hitler pushed to the fore in 1944, for example Tarnopol and, later, Breslau (Wrocław).[25] There was a German preference for a rhetoric of fortification, notably with 'Walls' and 'Lines', as in the Atlantic Wall and the Gustav Line in Italy, when interlocking defensive belts were more readily at issue. While some pre-war fortifications fell quickly during the war – such as the Belgian fortress of Ében-Émael in 1940, others saw stubborn and sustained resistance, as with the Soviet-held fortress at Brest -Litovsk in 1941, and, if that finally fell, the long resistance affected the German timetable.

There were also new fortifications during the war, some planned and prepared over a period of time, but other much more *ad hoc* and in a rapid response to the advances of opponents. The latter tended to depend on artillery which was usually given defences of its own, and, more generally, included perimeter and reserve positions.[26] The Japanese fortified islands against American attack, and notably so in 1944-5, as on Okinawa. There was multiple caves in rocky mountainous terrain which the Japanese developed with interlocking fire, as on

24 A. Hill, *The Red Army and the Second World War* (Cambridge, 2017), p. 192.

25 Hill, *Red Army and Second World War*, pp. 486, 501, 504-5.

26 J. Plowman, *German Breakthrough in Greece: The 1941 Battle of the Pineois Gorge* (Barnsley, 2024).

Saipan, Pelelieu and Iwo Jima. Their defence all inflicted costs on the attacking Americans, but each was taken relatively quickly.

The failure of fortifications as doctrine and practice was also seen after World War Two, as with the Bar Lev Line built by the Israelis on the eastern bank of the Suez Canal from 1967. It fell rapidly to a surprise Egyptian attack in 1973, with the Israeli plan for a supporting mobile defence thwarted by the speed of the Egyptian attack and the Egyptian ability to deploy relevant firepower. Another instance of fortifications linked to canals is discussed by Thomas Otte in his consideration of the Spanish Rhine-Meuse canal scheme in the early seventeenth century.

Post-1945 instances of sieges were numerous. They included some totemic sieges, such as Dien Bien Phu in 1954 and Hué in 1968. The first, a rapidly-fortified French landing site was captured by the Viet Minh, the second a North Vietnamese attack on South Vietnamese defenders who were relieved as a result of the destructive, firepower-strong American and South Vietnamese reconquest of the city.

In part, contrasting accounts of capabilities depended on the definitions of fortification advanced. For example, the *Times* on 27 February 2026 reported: 'On Friday, Afghanistan's air force targeted a military camp near the Faizabad neighbourhood of Islamabad, as well as an army barracks in Nowshera and a military site in Jamrud.' How far these should each be described in terms of fortifications is open to discussion, as with suggestions that land-based missile silos and ballistic missile submarines work as fortresses because they are to protect the missiles, while, operationally and/or strategically, the retaliatory nature of the missiles serves as a defensive means.

So, separately, with the impact of changes in weaponry. Thus, Iran's military defences in the event of attack by America in 2026 focused on anti-ship missiles and other means, such as drone swarms, that could be used to close the Strait of Hormuz. Also in 2026, the American firm Palatin planned to deploy inexpensive automated interceptors on the roofs of buildings in Ukraine, interceptors able to fly up and destroy incoming weapons without the requirement of human action. This changes the standard notion of fortification and overlaps with tactical weapons such as robotic vehicles armed with machine guns and operated by AI methods.

Moreover, linked to that point about definitions, several volumes can readily be suggested for any discussion of the topic of this book as opposed simply to this volume. For example, it is appropriate to discuss the aftermath of sieges, for victor, defeated and civilians, and to assess reasons for differences in this matter, notably the use of terror in order to lead others to surrender, as with Alexander the Great in Sogdiana and Bactria,[27] and the Spanish Army of Flanders in acting against captured garrisons and townspeople in the Dutch Revolt.[28]

There are also generally differences in this and other respects between civil wars and international conflicts, and notably so in the first case because of the focus on suppressing rebellions which was a key context for the Dutch Revolt in the late sixteenth century. There, as also in the brutal sack of Protestant Magdeburg in 1631 during the Thirty Years' War (1618-48), religious differences also played a role.

Civil wars usually entail an absence of a role for the fortifications concentrated in border regions. However, the fortified nature of the capital is generally of major significance, and fortifications could be improvised, as for the English and American Civil Wars[29] and for Madrid in 1936, a year in which the Alcazar of Toledo also proved an important fortress.

Civil wars raise important issues for analysis. Key base areas as used in insurrections, for example in Afghanistan in the 1980s,[30] can be assessed as fortified zones, and that requires a looser definition of fortifications. From that perspective, any place where staunch resistance is mounted can represent a fortifi-

27 T. Howe, 'Alexander and "Afghan Insurgency": A Reassessment', in Howe and L.L. Brice (eds), *Brill's Companion to Insurgency and Terrorism in the Ancient Mediterranean* (Leiden, 2016), pp. 172-6.

28 S.D. Bowd, *Renaissance Mass Murder: Civilians and Soldiers During the Italian Wars* (Oxford, 2019); G. Daly, '"The Sacking of a Town is an Abomination": Siege, Sack and Violence to Civilians in British Officers' Writings on the Peninsular War – the Case of Badajoz," *Historical Research*, 92 (2019), 160-82; J. Childs, 'Surrender and the Laws of War in Western Europe, c.1650-1783,' in H. Afflerbach and H. Strachan (eds), *How Fighting Ends: A History of Surrender* (Oxford, 2012), pp. 153-68.

29 D. Flintham, *The Town Well Fortified: The Fortresses of the Civil War in Britain, 1639-1660* (Warwick, 2023).

30 Hill, 'The Soviet War in Afghanistan', and T. German, 'The Chechen Wars' in Hill (ed.), *The Routledge Handbook of Soviet and Russian Military Studies* (Abingdon, 2025), pp. 265, 314-15.

cation, as can, differently, ambush sites. In turn, the success of both owes much to the suitability of units for overcoming defences, not least in terms of training and weaponry. The war in Ukraine from 2022 and the Iran War of 2026 added fresh uncertainty about the understanding of what constituted fortifications.

At the same time, the war in Ukraine continues the relationship between fortresses and territorial changes. The loss of a fortress can mean difficulty in trying to retain an area in peace negotiations, as with the French gain of Roussillon and Franche Comté in 1659 and 1678 respectively after wars in which their fortresses had been conquered.

The fundamental organisation in this book is chronological. That is appropriate, but, crucially, without implying that any given situation was necessarily an advance on what came earlier, or even necessarily represented an incorporation of previous trends. The organisation, instead, serves to suggest the value of assessing the situations that are chronologically close, and the role accordingly of fitness for purpose in such a context. How such fitness changes is of great consequence, at once cause, coincidence and/or consequence of broader developments, military, political, economic and social, but also a response to the more specific exigencies arising from particular conjunctures.

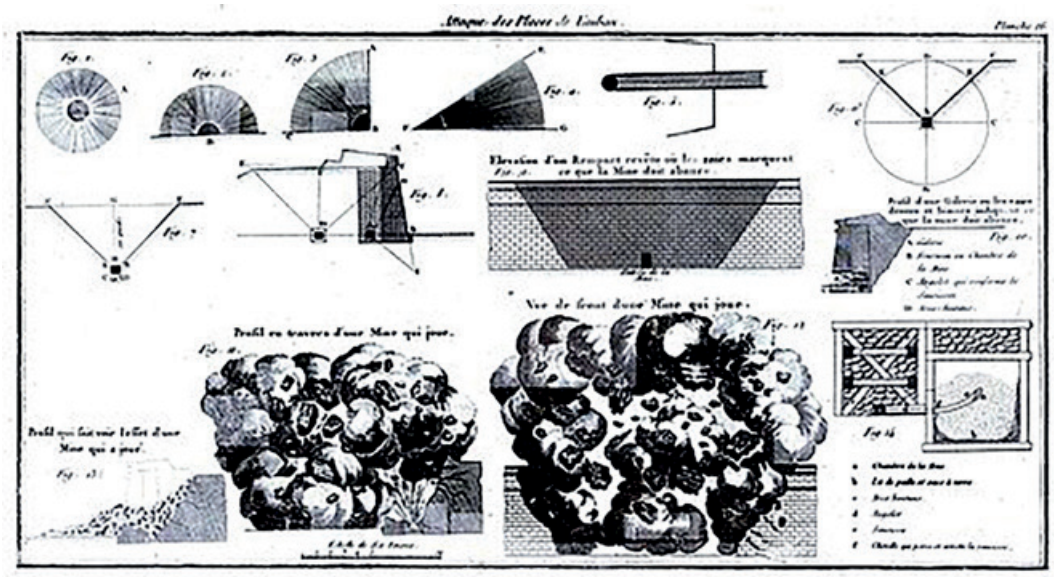
Many themes can be seen across time, even if their contexts and manifestations vary greatly. This is true for example both of the relationship between fortifications and siege-defence, the first, generally, but not always, the static element; and, very differently, of fortress-siting. This important topic can be approached in a number of ways, for example in relation to resupply operations, an issue discussed in diachronic terms by Ulf Sundberg in his chapter. Diachronic approaches expand the possibilities for comparison. Siting can refer both to individual fortresses and to those as part of a system.

The need for fortresses to receive resupply or relief emerges as another continuing element, as in the essay by Mark Stevens. The Mediterranean was dotted with fortress-ports in the sixteenth century. They had a symbiotic relationship with the galley fleets which dominated warfare in the area. Without the ports the fleets could not operate. Many of the fortress ports were besieged and Stevens has focused on four of them. He uses Rhodes and Malta, both held by the Knights of St John, and Corfu and Famagusta, held by the Venetian Republic, to demonstrate the absolutely critical role that seapower played in both the attack

and defence of these critical bases. Maritime capacity, capability and competence provided the key to success and failure in all operations involving the attack or relief of these seaside bastions. Stevens considers the crucial role of relief in weakening or ending sieges in the Mediterranean. The four chosen examples are all still in a state of remarkable preservation, and demonstrate how technologically advanced they were and how they all made maximum use of artillery in their defence. Stevens stresses the need for adequate ongoing logistic support during operations, and also the adverse impact of the weather. Planning to attack or defend a fortified port was fundamentally dependent on seapower to be successful.

André Murteira argues that Malacca fell in 1641 to Dutch attack when it had survived that by Aceh in 1629 not because of some supposed Dutch military superiority, but because of a lack of naval relief, which also was crucial at Colombo in 1656 and 1663. So also with the American War of Independence, with Gibraltar surviving Spanish attack but not the British base at Pensacola in 1781 or Minorca the following year. The presence or absence of naval relief emerges as more important to the outcome of some sieges than anything having to do with more conventional accounts of siege warfare, notably fortification design and siege attacks. Looked at differently, this raises questions about how best to define siege warfare.

Expectation of rapid relief could affect the scale and nature of fortification as with the absence of a second line with the Maginot Line. The need for relief was the case not only for cutting-edge fortress systems with advanced weaponry, but also for less expensive ones. Thus, in North America, as Jason Warren shows, Native American fortresses moved from circular hilltop type to geometric earthen works built in more inaccessible terrain, albeit on a much smaller scale than in Europe. There was almost always a means of relief for these forts, and hence Native American fortifications were part of a larger system of defence and not meant to stand alone. Thus, fortification density and nearby villages were key to any particular fort's survival. Alliances were also critical to the survival of fortresses as they were often the source of the assistance that broke the siege or threatened the besiegers' lines of communication. The threat of massacre by Native American allies was used by European commanders in North America to



Vauban, *Traité des sièges et de l'attaque des places* (planche xvi)

force an early and regular surrender of besieged European garrisons.[31]

The need to ensure supplies can mean that the battle for the supply lines equals that of the struggle at the besieged position itself. In the case of the German siege of British-held Tobruk in 1941, the struggle was greater.

Another theme that repays consideration as a continuing element is that of the strategic, operational and tactical risk-aversion that fortifications are designed to satisfy. Alongside variety in fortification and siegecraft, both diachronic and at particular moments, therefore, comes, and also repeatedly, the presence of continuing themes.

This collection more generally represents the capacity of current scholarship to extend coverage and thereby both strengthen the basis for analysis and for comparative consideration. Fortress warfare and its influence on wars and treaties remains understudied and this volume seeks to address this issue. It is one that is important for today and the future as the days of seeking protection, and thus allowing few to fight many, are not over.

31 See also A.A. Cave, *The Pequot War* (Amherst Mass., 1996).

Hyacinthe Rigaud (1659-1743), Portrait of Sébastien Le Prestre de Vauban, a french military architect and politician (detail). Wikimedia commons

Blood, Battering Rams, and the Occasional Traitor. A Reappraisal of Greek Siege Warfare

by Alessandro Carli

Introduction

Walls, ramparts, outposts, and materials salvaged from houses are essential to a siege. At the same time, anyone aiming to capture a city must, as a primary concern, gain control of a wall whenever possible; whether through capture, destruction, or scaling, this is a crucial step toward overthrowing the enemy. As a result, siege warfare and the history of defensive fortifications, in the various forms they have taken over time, are deeply interconnected, with with innovation in one sphere consistently shaping developments in the other. This point is clearly evident in Yvon Garlan's seminal work, whose 1974 monograph remains the principal resource for examining this aspect of warfare in the Greek world even today[1].

In more recent years, however, studies focusing on fortifications have taken a greater interest in their engineering aspects, perhaps at the expense of certain military considerations that would help to provide a clearer picture. These are, for the most part, valuable works of particular archaeological and material interest that are too often overlooked in accounts of sieges[2]. This phenomenon is equally evident in military studies. Siege warfare, as is well known, touches on many aspects of the ancient world: from the logistics of preparations and countermeasures, to technical aspects – manuals in this field stand out as a sec-

1 Yvon Garlan, *Recherches de Poliorcétique Grecque*, De Boccard, Paris 1974.

2 The main starting point is the collecting volume of Rune Frederiksen - Silke Müth - Peter I. Schneider - Mike Schnelle (ed.), *Focus on Fortifications in the Ancient Mediterranean and the Near East*, Oxbow Books, Oxford 2016; Silke Müth, «Fortifications», in Waldemar Heckel – Fred. S. Naiden – E. Edward Garvin (ed.), *A Companion to Greek Warfare*, Wiley Blackwell, Hoboken 2021, pp. 241-251.

tor in their own right – through to its more social dimensions. Indeed, sieges also involved those sections of the population not usually associated with war, such as women and children. In contrast to the earlier academic tradition, which relegated sieges to a secondary role relative to hoplite warfare, the subject has returned to the forefront of scholarly debate in recent years and has also been examined from an epistemological perspective. Fernando Echeverria's work in this regard now constitutes an essential starting point for future studies on sieges in Greek warfare[3].

However, current studies lack the comprehensive perspective characteristic of Garlan, as well as his methodological approach and technical expertise. In writing this work, we have repeatedly reflected on the reasons behind this divide in the study of poliorcetics. The answer may well sound like a truism: it can be attributed to a greater degree of specialisation within academic disciplines and to the difficulty of producing a work that accounts for the various directions scholarly research has taken in recent years. In this paper, we have sought to provide an overview of certain themes in siege warfare from the Archaic to the Classical period, without delving into the Hellenistic period, which would require far more space. This paper aims to highlight certain approaches adopted by scholars, whilst challenging certain points where necessary. One of the objectives we set ourselves in the course of this work was to examine how the interaction between besiegers and fortifications has changed, in the hope that in future we might once again reflect on siege warfare in the Greek world with the same breadth of vision as Yvon Garlan.

Until the Persian withdrawal: representations of sieges during the Archaic period

Whenever we attempt to engage with the Archaic period and to examine one of its many aspects - warfare in this case, or, more precisely, siege warfare – the available sources provide only a limited, fragmentary outlook. They tend

3 Cfr. Fernando Echeverria, «Notes on the conceptualization of poliorcetics in archaic and classical Greek Literature», *Dialogues d'histoire ancienne*, 47.1 (2021), pp. 71-95; Fernando Echeverria, «Assaults and Sieges. Rewriting the Other Side of Greek Land Warfare», in Roel Konijnendijk – Cezary Kucewicz – Matthew Lloyd (ed.), *Brill's Companion to Greek Land Warfare Beyond the Phalanx*, Brill, Leiden – Boston 2021, pp. 236-265 with further bibliography.

to sketch through poetic code rather than to explicate. Owing to the absence of extended descriptions, scholars are compelled to construct their hypotheses on the basis of every single word preserved in epic poems and lyric poetry[4]. Even without venturing too far with speculative deductions, certain considerations nevertheless can be advanced with a fair degree of confidence[5]. If we turn to the Homeric poems and their treatment of military operations against small towns and villages, some distinctive narrative patterns emerge. Heroes situated at opposite poles of generalship, such as Achilles and Odysseus, can proudly enumerate among their military achievements the capture, sacking, and even wholesale destruction of various settlements, whether fortified or not[6]. These actions fall within the very common category of swift campaigns characterised by plunder and raiding warfare[7]. It is likely that such episodes resembled other attempts to seize fortifications, in which attackers sought to scale towers or other ramparts before proceeding to wipe out the settlement[8]. How the besiegers actually climbed the ramparts remains difficult to establish; nevertheless, we should not forget that the narrative did not require an explicit mention of ladders[9]. Setting out from the epic poems could be perceived as a delicate undertak-

4 Yvon Garlan, *Recherches de Poliorcétique Grecque*, cit. p. 10 adopts for a more drastic approach when, not without reasons, he begins his analysis with Thucydides, arguing that allusions in Homeric poetry and Herodotus are rare and often uncertain.

5 For siege warfare during archaic period: cf. Michael G. Seaman, «Early Greek Siege Warfare», in Lee L. Brice (ed.), *New Approaches to Greek and Roman Warfare*, Wiley Blackwell, Hoboken 2020, pp. 29-38 with previous bibliography.

6 Cf. Hom. *Il.* 9.328-331; *Od.* 14.229-31: Fernando Echeverria, «Greek armies against towns. Siege warfare and the Seven Against Thebes», in I. Torrance (ed.), *Aeschylus and War. Comparative Perspectives on Seven Against Thebes*, Routledge, London 2017, p. 76; cf. James V. Morrison, «Thematic Inversion in the Iliad: The Greeks under Siege», *Greek, Roman & Byzantine Studies*, 35.3, (1994), pp. 211-213.

7 Cf. Alastar Jackson, «War and raids for booty in the world of Odysseus», in John Rich – Graham Shipley (ed.), *War and Society in the Greek World, Routledge*, London – New York 1993, 64-76; Louis Rawlings, *The ancient Greek at war*, Manchester, Manchester University Press 2007, pp. 28-31.

8 Cf. the Epean attack against Thyroessa (Hom. *Il.* 11.711-733) and the Curetes' assaults to Calydon (Hom. *Il*. 9.529-532; 550-552; 573-599): cf. Hans van Wees, *Status Warriors. War, Violence and Society in Homer and History*, J. C. Gieben, Amsterdam 1992, pp. 192-193 and pp. 195-199.

9 Indeed, how Fernando Echeverria, «Greek armies against towns», cit. p. 82 notes, the first mention of ladders in a military context is found in Aesch. *Sept*. 465-467.

ing – of course, this work is not the opportune place to resume the debate on the historicity and other hoary questions regarding epics – yet it is not groundless; we should not overlook, however, that the subsequent poetic traditions followed the path laid down by Homer[10]. For instance, Theognis of Megara boasted, on the basis of his personal experience, of having climbed a very tall wall and, although capable of doing so, refrained from storming the city (Theog. 950: τειχέων δ' ὑψηλῶν ἐπιβὰς πόλιν οὐκ ἀλάπάξα). This verse carries two implications. First, the complete destruction of a settlement accorded with the audience's expectations – during the well-known Lelantine War, the poet elsewhere complains about the miserable fate of Cerinthos in Euboea[11] – and his restraint would therefore have sounded unexpected. Secondly, scaling a wall or similar defences was not considered an uncommon way to approach a fortified place, despite the several risks to the assailants.

If we set aside poetic sources and turn to historiographical accounts, Herodotus describes several siege operations conducted by Greek poleis from the Archaic period through the conflicts against Persia[12]. It should not be overlooked that, unless otherwise specified, Herodotus, as a fifth-century historian, has an awareness of contemporary warfare even when he is describing earlier historical periods. In the *Histories*, the only polis to disappear following a border-conflict between Hellenic communities was the prosperous Sybaris, probably in 510. In his account, Herodotus limits himself to mentions of conquest, perhaps implying destruction; however, later sources indicate that the nearby Croton destroyed the city and diverted the surrounding rivers to inundate Sybaris after

10 For the Homeric heritage: cf. P. C. Millet, *Writers on War. Part I. Greece*, in Brian Campbell – Lawrence A. Tritle (ed.), *The Oxford Handbook of Warfare in the Classical World*, Oxford University Press, Oxford 2013, pp. 48-51; José Vela-Tejada, *War in Greek Poetry*, in Waldemar Heckel – Fred. S. Naiden – E. Edward Garvin (ed.), *A Companion to Greek Warfare*, Wiley Blackwell, Hoboken 2021, pp. 398-401.

11 Theog. 891: Victor Parker, *Untersuchungen zum Lelantischen Krieg und verwandten Problemen der frühgriechischen Geschichte*, Franz Steiner Verlag, Stuttgard 1997, pp. 82-85. For other references on conquest of cities cf. Theog. 236; Archil. 23.17-18; Mimn. 9.6.

12 For Herodotus and warfare: Lawrence Tritle, «Herodotus and Warfare», in C. Dewald – J. Marincola (ed.), *The Cambridge Companion to Herodotus*, Cambridge University Press, Cambridge 2006, 209-223; on sieges in the *Histories*: David Whitehead, «Siege Warfare», in Waldemar Heckel – Fred. S. Naiden – E. Edward Garvin (ed.), *A Companion to Greek Warfare*, Wiley Blackwell, Hoboken 2021, pp. 101-102.

the fall[13]. The details of the siege and the reasons behind its capitulation remain problematic. More detailed records, however, exist for failed assaults. In 525, the Spartans launched an extensive siege against Samos, then under the tyrant Polycrates[14]. The besieging forces were accompanied by Corinthian allies, who likely provided the expensive fleet[15]. Herodotus characterises this siege as relying on direct assaults, with the Spartans and their allies attempting to scale a specific tower - the expression chosen by the historian echoes poetic terminology we have already encountered - yet the defenders, present in large numbers, repelled the attackers. During these days, the Samians, who were supported by mercenaries, attempted a counterattack, opting for a sortie, but were ultimately driven back by the Spartans. Although this effort failed, it exemplifies the typical scenario in which a besieging force undertakes to break the siege by sallying from behind its fortifications. This siege ended after forty days. The reasons behind the withdrawal are not explicated by Herodotus; it is possible to infer that the large number of besiegers entailed logistical difficulties in securing food supplies, which depended primarily on the surrounding territory[16].

A comparable situation with further interesting characters occurred at Paros,

13 Hdt. 6.21. For further details: Strab. 6.1.13: R. J. Evans, «The capture of Sybaris (510 BC), and the siege of Mantinea: history repeated?», *Acta Classica*, 57 (2014), pp. 225-232. For a similar expedient, cf. the fate of Krisa (Paus. 1.40.1): F. E. Winter, *Greek Fortifications*, Toronto, University of Toronto Press 1971, pp. 50-51.

14 Hdt. 3.48-49; 3.56-56. On this Spartan expedition overseas: Paul Cartledge, «Sparta and Samos: A Special Relationship?», *The Classical Quarterly*, 32.2 (1982), pp. 243-265; Graham Shipley, *A History of Samos 800-188 BC*, Clarendon Press, Oxford 1987, pp. 97-98; Scott M. Rusch, *Sparta at War. Strategy, Tactics, and Campaigns. 550-362 BC*, Frontline Books, London 2011, pp. 26-28; Aideen Carty, *Polycrates, Tyrant of Samos. New Light of Archaic Greece*, Franz Steiner Verlag, Stuttgart 2015, pp. 177-195; Ellen Millender, «The Spartans "at Sea"», *Historikà*, 5, (2015), pp. 303-304.

15 Hdt. 3.48.1: J. B. Salmon, *Wealthy Corinth. A History of the City to 338 BC*, Clarendon Press, Oxford 1984, pp. 243-245.

16 Regarding this logistical concern: Yvon Garlan, *Recherches de Poliorcétique Grecque*, p. 118; cf. Murray, «Diet, Preparation, and Consumption in Homer», in John F. Donahue – Lee L. Brice (eds.), *Brill's Companion to Diet and Logistics in Greek and Roman Warfare*, Brill, Leiden – Boston 2023, pp. 41-42. How much the landscape could bring about assailant's choices and logistics: Gwyn Davies, «The Landscape of Sieges», in Jeremy Armstrong – Matthew Trundle, (ed.), *Brill's Companion to Sieges in Ancient Mediterranean*, Brill, Leiden – Boston 2019, pp. 18-34.

which was besieged by the Athenians in 489[17]. After the battle of Marathon, Miltiades, then at the zenith of his fame, made several efforts to persuade his fellow citizens to provide him with a significant amount of funding. Herodotus specifically states that Miltiades asked for 70 triremes, an army – given that each ship carried 200 men, the army would amount to 14.000 men – and additional resources. Here we find the core binomial of siege warfare: a sizable army to undertake operations and, above all, money. A significant supply of funds, in particular, was hard to obtain in the relatively modest context of the polis. In addition to these requests, Miltiades' behaviour to win over the Athenians needs to be considered: he did not reveal to the Assembly either the expedition's destination or its precise objectives. If they granted everything he had required and agreed to follow him, he merely ensured a great acquisition of money and other forms of wealth[18]. As we shall see in the episode of Sestos and in the Athenians' subsequent behaviour, Miltiades was well aware of the audience's reluctance to embrace a wasting time expedition – sieges, of course, were neither a raiding campaign nor a quick picked battle – and how much the outcome of a siege could enrich the besiegers, if winners. In short, the Athenians followed Miltiades, placing trust in his words and lured by the prospect of substantial reward. Unlike in the case of the siege of Samos, on this occasion Herodotus does not refer to the Athenians' plans and operations; instead, his attention turns toward the countermeasures adopted by the Parians. Among the several ideas - Herodotus makes it clear that they were striving in several ways – the besieged chose to reinforce some sections of the town walls during the night. This strategic choice is significant in several ways. First, it is likely they understood the Athenians were planning direct assaults, and the Parians therefore sought to deter the enemy as soon as possible. Yet this countermeasure represents, in the history of ancient Greek warfare, the earliest example, as far as we know, of a vertical counter-wall raised by defenders: such an escamotage would become relatively common in later sieges[19]. After a brief Herodotean digression on the circum-

17 Hdt. 6.132-136: Robert Develin, «Miltiades and the Parian Expedition», *L'Antiquité Classique*, 46.2 (1977), pp. 571-577.

18 According to S. Link, «Das Paros-Abenteuer des Miltiades (Hdt. 6, 132-136)», *Klio*, 82.1 (2000), pp. 49-52, Miltiades wanted to undertake this expedition only for the rich booty.

19 For the walls as a deterrent: Pierre Ducrey, «Defence, Attack and the Fate of the Defeated: Reappraising the Role of the City-walls», in Rune Frederiksen – Silke Müte – Peter I. Schnei-

stances of Miltiades' illness, the narrative concludes with the failure of the siege and the Athenians' withdrawal. With a deep disappointment for the absence of the promised rich booty, the Athenians simply ravaged the surrounding territory before returning home after 26 days[20].

The siege that straddles the Archaic and the Classical Period occurred at Sestos in 479, after the Persian retreat, when the Athenians, led by Xantippos, decided to remain in the Hellespont[21]. The operations that took place over some months[22] allow us to glimpse two further features of siege warfare: the psychology of the besiegers and the extreme distress that the local population had to endure to survive. Herodotus first notes that the city had a significant city wall[23], but the citizens were unprepared for an unexpected siege. The reader foresees the difficulties the Athenians will encounter in overwhelming the walls, as well as the logistical difficulties for the inhabitants of Sestos. After some time, the Athenians started to suffer from the strain of remaining abroad – at this point, we can grasp the skilful, cautious rhetoric of Miltiades in front of the Assembly – and they were still unable to overwhelm the ramparts[24]. Herodotus highlights their deep unease to the point that they requested that the generals lead them home. According to their reply, the Athenians would not return before the capture of the city, or unless otherwise communicated by the Athenian assembly. Meanwhile, behind the walls, the citizens of Sestos were afflicted by

der – Mike Schnelle (ed.), *Focus on Fortification. New Research on Fortifications in the Ancient Mediterranean and the Near East*, Oxbow Books, Oxford & Philadelphia, 2016, pp. 332-336.

20 Lionel Scott, *Historical Commentary on Herodotus Book 6*, Brill, Leiden – Boston 2005, p. 435 argues that during nights the Parians could bring some provisions in the city by sea.

21 On this siege: A. R. Brun, *Persia and the Greeks. The Defence of the West, c. 546-478 B.C.*, Duckworth, London 1984, pp. 553-554.

22 For a chronological overview: C. Hignett, *Xerxes' Invasion of Greece*, Clarendon Press, Oxford 1963, pp. 261-263.

23 Hdt. 9.115.2. According to David Asheri – Aldo Corcella, *Erodoto. Le Storie. Libro IX. La Battaglia di Platea*, Mondadori, Milano, 2006, p. 334, Sestos was notorious in antiquity for her defenses (cf. Thuc. 8.62.3; Xen. *Hell*. 4.8.5; *BNJ* 115 F 390).

24 Matthew Trundle, «The Introduction of Siege Technology into Classical Greece», in Jeremy Armstrong – Matthew Trundle, (ed.), *Brill's Companion to Sieges in Ancient Mediterranean*, Brill, Leiden – Boston 2019, p. 138 supposes that the besiegers sieged through circumvallation; yet Herodotus stresses how much the Athenians were unable to capture the wall (Hdt. 9.117: οὐ δυνάμενοι ἐξελεῖν τὸ τεῖχος).

starvation to the point of eating the leather belts of their beds. Sieges were thus a matter of resilience, physical as well as psychological, for the assailants who could become, in effect, the "besieged"[25], and for the local population, which had reached extreme conditions of malnutrition[26]. This siege ended when some of the inhabitants opened the gates to the Athenians.

Based on what has emerged, certain patterns can already be ascertained for the Archaic period. When circumstances permitted – that is, where the walls were not insurmountable, and the assailants had some availability of troops to employ – the besiegers were not entirely averse to direct assaults. At first glance, it might seem the opposite. Nevertheless we should not overlook that these attacks were directed against modest fortifications and did not appear to have entailed an excessive risk to the assailants, who did not persevere if unsuccessful. When the defences could not be overcome, armies were "content" to ravage surrounding territories before withdrawal. The sieges did not last a significant amount of time, almost 40 days. Inside the besieged cities, we can see several attempts to dissuade the assailants with counter-walls, which could deter possible assaults, and, most notably, the community had to organise at best provisions so as to withstand the siege for as long as possible. In the end, if the previous organisation had allowed it, time proved to be the most effective ally for the besieged community.

The fifth century before the struggle between Athens and Sparta

With the withdrawal of the Persians, siege warfare became an endemic feature of Greek conflicts and can help shape our understanding of warfare, especially on a large scale. Before examining this topic in depth across the fifth and fourth centuries, a preliminary remark is unavoidable: in contrast to the Archaic period, with its cursory references and intermittent accounts, the rise

25 On the Athenian unease at Sestos: Marco Bettalli, «Il controllo di città e piazzeforti in Tucidide: l'arte degli assedi nel V secolo a.C.», *Annali della Scuola Normale Superiore di Pisa. Classe di Lettere e Filosofia*, 23.3/4 (1993), pp. 828-829.

26 Starvation was the common problem (and expedient for the besiegers) among the ancient mediterranean: Jeremy Armstrong – Matthew Trundle, «Introduction», in Jeremy Armstrong – Matthew Trundle, (ed.), *Brill's Companion to Sieges in Ancient Mediterranean*, Brill, Leiden – Boston 2019, pp. 2-6.

of historiography profoundly affects our perception of ancient warfare, including sieges. This may appear to be a mere truism, yet the attested exponential increase in sieges during the Classical period is, in part, a direct consequence of a consistent and continuous historiographical tradition of war narratives[27]. We cannot, therefore, simply assume that the Greeks opted for this kind of warfare more frequently, reflecting a different attitude from previous centuries, or that they regarded siege warfare as a new means by which to overwhelm their enemies. Rather, if we evaluate the specific context of each case – of course, every siege had its own genesis, execution, and outcome - it is more appropriate to ask why, during a specific situation, the Greeks decided to capture a fortified settlement, how they mobilised to defeat their enemies who were doing their utmost to survive, and, no less importantly, how the victor behaved toward the subjugated population.

Over these two centuries, historiographical sources mention sieges on numerous occasions but provide only a few detailed accounts deserving due consideration. If we examine the Pentecontaetia, Athens played a prominent role in this kind of warfare[28]. This perception perhaps owes much to the fact that the growth of this polis and the consequent consolidation of the Athenian empire are the focus of our main source: Thucydides. The Athenians had early understood that walls would be central to the community and the position they aimed to hold. It should not be forgotten that, even though the Spartans turned up the noise, one of the first steps after the Persian wars was the construction of

27 On the concept of "war monograph" and its problems in historiographical discourse: Tim Rood, «The Development of War Monograph», in John Marincola (ed.), *A Companion to Greek and Roman Historiography. Volume I*, Blackwell Publishing, Oxford 2007, 147-158. Even we do not agree with the general points, Simon Hornblower, «Warfare in ancient literature: the paradox of war», in Philip Sabin – Hans van Wees – Michael Whitby (eds.), *The Cambridge History of Greek and Roman Warfare. Volume I: Greece, the Hellenistic World and the Rise of Rome*, Cambridge University Press, Cambridge 2007, pp. 22-53 is a pivotal starting point for the presence of war in the Greek literature.

28 For the events during this period: Marco Bettalli, «La Grecia durante la Pentecontetia», in Maurizio Giangiulio (ed.), *Storia d'Europa e del Mediterraneo. I. Il Mondo Antico. Sezione II. La Grecia. Volume IV. Grecia e Mediterraneo dall'età delle guerre persiane all'ellenismo*, 2008, pp. 249-288; Simon Hornblower, *The Greek World. 479-323 BC*. Fourth Edition, Routledge, London – New York 1-42; Lisa Kallet, «The Pentecontaetia», in Ryan K. Balot – Sara Forsdyke – Edith Foster (ed.), *The Oxford Handbook of Thucydides*, Oxford University Press, Oxford 2017, 63-80.

the Long Walls by the entire Athenian population. Among the many meanings, economic and strategic, these walls represented Athens' self-determination[29]. It is no coincidence that, following the outcome of a siege, the Athenians, as well as other victors, chose to knock down the walls of the defeated. After 478, the Athenians continued the war in the Aegean against Persia, besieging Byzantion, Eion, Scirus, Phaselis, and Karistus over a few years, probably using circumvallation[30]. This method was certainly employed to win over Naxos in 468, the first ally against which Athens turned her attention. Some years later, following a battle outside the walls, the Athenians besieged Thasos with a circumvallation that lasted three long years[31]. The fact that Thucydides highlights the duration should alert us to how he and his audience perceived both the difficulty of overcoming the besieged and, most importantly, the Athenian resoluteness. All these expeditions may have earned the Athenians a reputation for expertise in siegecraft. The Greek verb in question employed by Thucydides, τειχομαχεῖν, however may allude instead to direct assaults – probably against modest ramparts – rather than to their consistent employment of circumvallation[32]. This alleged expertise, in turn, induced Sparta, traditionally regarded by modern scholars as "unskilled" in this field, to seek their resolutive assistance in reducing the helot rebels on Mt. Ithome, in vain[33].

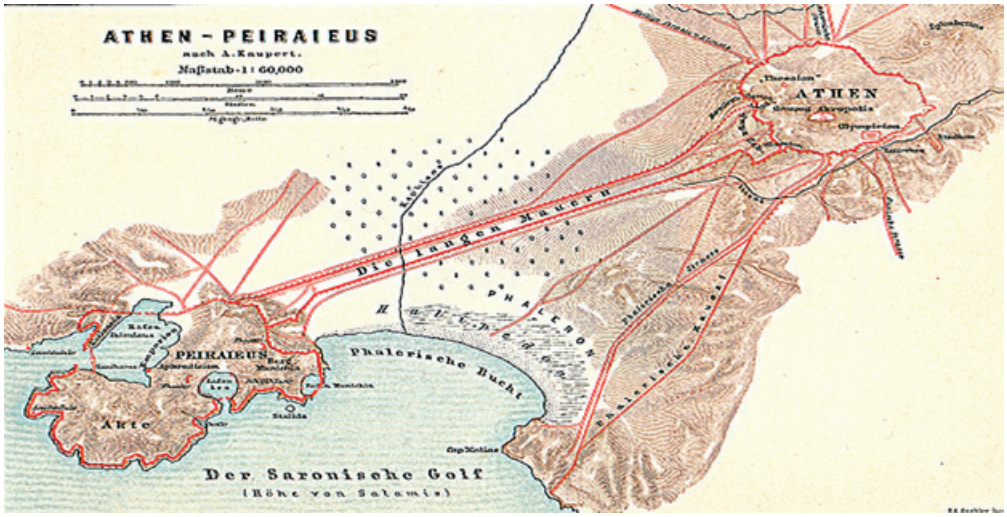
29 Thuc. 1.93: Christy Constantakopoulou, *The Dance of the Islands. Insularity, Networks, the Athenian Empire and the Aegean World*, Oxford University Press 2007, pp. 137-150.

30 On these sieges: Paul B. Kern, *Ancient Siege Warfare*, Indiana University Press, Bloomington – Indianapolis 1999, 94-95.

31 Thuc. 100.2-101.3; Plut. *Cim.* 14.1: Matteo Zaccarini, *The Lame Hegemony. Cimon of Athens and the Failure of Panhellenism, ca. 478-450 BC*, Bononia University Press, Bologna 2017, 147-177; Leah Lazar, *Athenian Power in the Fifth Century BC*, Oxford University Press, Oxford 2024, pp. 156-159.

32 Thuc. 1.102.2 and vd. mostly 7.79.2; cfr. Hdt. 9.70.9; Aristoph. *Nub*. 481; Xen. *Hell*. 1.1.14. Further research should concentrate on the nuances of τειχομαχεῖν with other terms linked with assaults and similar ways.

33 Cfr. David M. Lewis, «Mainland Greece, 479-451 B.C.», in David M. Lewis – John Boardman – John K. Davies – Martin Ostwald (ed.), *The Cambridge Ancient History. Volume 5. The Fifth Century B.C.*, Cambridge University Press, Cambridge 1992, pp. 108-109; Paul A. Rahe, *Sparta's First Attic War. The Grand Strategy of Classical Sparta, 478-446 B.C.*, Yale University Press, New Haven – London 2019, pp. 124-127 and *passim*.



Johann August Kaupert. Lange Mauern aus: *Baumeister: Denkmäler des klassischen Altertums*. 1885. Band I., Seite 209. Wikimedia Commons

In the years preceding the Peloponnesian War, the most significant siege was that undertaken against the troublesome ally, Samos, in 440[34]. In his thorough account, Thucydides is mainly concerned with the complex naval operations. According to the historian, the Samian episode illustrates how Athenian naval power had grown and how seriously it would have been threatened had the war against the ally taken a wrong turn. For the siege operations, he notes that the Athenians raised three walls on the mainland, while simultaneously using their fleet to close the harbour (Thuc. 1. 116.2: ἐπολιόρκουν τρισὶ τείχεσι τὴν πόλιν καὶ ἐκ θαλάσσης ἅμα). Their objective was clearly to reduce Samos to starvation as swiftly as possible. The Samians also succeeded in breaking the naval blockade to import supplies, presumably even in the hope that the besiegers

34 On the Samian episode in general and for its meaning for the Athenian imperialism: Marek Węcowski, «In the Shadow of Pericles: Athens' Samian Victory and the Organisation of the Pentekontaetia in Thucydides», in Antonis Tsakmakis – Melina Tamiolaki (ed.), Thucydides Between History and Literature, De Gruyter, Berlin 2013, pp. 153-166; Giovanni Parmeggiani, «Decontestualizzazione e ricodificazione erodotea: una possible allusione alla guerra di Samo in Hdt. VII 162, 1-2», Rivista storica dell'antichità, 52 (2022), pp. 23-44; For the military operations: cf. Graham Shipley, *A History of Samos*, cit. pp. 112-220; Gianfranco Mosconi, «Pericle e il buon uso del corpo del cittadino: l'assedio di Samo», *Mediterraneo antico*, 17 (2014), pp. 573-608.

would thereby give up the siege. When the harbour was once again sealed off by the Athenian fleet, the city capitulated after nine months. As might be expected after such a complex siege, for the Athenians too, Samos lost its autonomy, and the circuit wall was demolished by the victorious forces. The siege of Samos encapsulates some salient traits of poliorcetics, mainly Athenian, during the Pentecontaetia: even though such sieges entailed great costs for the besiegers[35], Athens, thanks to its imperial revenues, succeeded in undertaking similar operations of varying duration (as we have seen, from a few months to three years before capitulation). One can hardly escape the impression that other communities, considered individually, lacked the same economic and manpower resources to pursue similar enterprises.

Before considering the Peloponnesian War and its poliorcetic operations, it is necessary to address a significant aspect of the siege of Samos that would come to characterise some subsequent sieges. Later sources appear, at first sight, to supplement Thucydides' account by referring to the alleged role of Artemon of Clazomenae, who is said to have prepared battering rams and tortoises[36]. According to Diodorus, Pericles – the real subject of his account – was the first general of that period to employ such siege engines in siege operations. This incidental remark, for it is ultimately nothing more than that, has some implications for the history of sieges among the Greek poleis. These later sources have been taken seriously by scholars, who have used them to propose a possible date for the introduction of these instruments into Greek siege warfare[37]. On the basis of this reading – which implicitly presupposes the exclusive employment of ladders before the 440s – the Greeks, through Artemon's mediation, appear in the second half of the fifth century as "pupils" of the Persians. The Achae-

35 Samos siege cost around 1.400 talents: vd. with further bibliography David Rosenbloom, «Naval Service and Political Power in Classical Athens: An Inverse Relation», in Jeremy Armstrong – Arthur J. Pomeroy – David Rosenbloom (ed.), *Money, Warfare and Power in the Ancient World: Studies in Honour of Matthew Freeman Trundle*, Bloomsbury Academic, London – New York 2024, pp. 51-52.

36 Cfr. Diod. 12.28; Plut. *Per.* 27. For a short-profile of Artemon: Arnold W. Gomme, *A Historical Commentary on Thucydides. Volume I. Introduction and Commentary on Book I*, Clarendon Press, Oxford 1945, p. 354.

37 Cfr. E. Winter, *Greek Fortifications*, cit. pp. 85-86; Gianfranco Mosconi, «Pericle e il buon uso del corpo del cittadino», cit. pp. 587-589; Matthew Trundle, «The Introduction of Siege Technology», p. 138; David Whitehead, «Siege Warfare», p. 103.

menids, drawing on Near Eastern traditions, were already masters of siegecraft and had adopted these techniques from several decades earlier. Contact with Hellenic communities in Anatolia, therefore, is seen as a conduit for the transfer of knowledge in Greek warfare[38]. This is not the place to examine and cover this issue in detail, nor do we endorse this deterministic model, which assumes a linear sequence comprising Near East empires' use of siege machines, Achaemenid mediation and, in the last stage, Greek passive reception. Influence might be possible, yet it does not, in itself, imply a complete loss of initiative and experimentation. However, remaining on the figure and role of Artemon, we side with those scholars[39] who maintain a degree of scepticism of this later tradition concerning the alleged invention of, or the first adoption of, tortoises and battering rams: not with regard to the use of these engines, especially battering rams, but on account of the tendency to attribute to this episode an undue degree of technological significance when set against the previous periods characterised by backwardness. Rather, we are more inclined to see the Samos episode as a significant indication, in the available sources, of a more varied approach to sieges that would become apparent during the Peloponnesian War, in which one can encounter several methods, tailored to each individual situation, for reducing fortified places.

38 Needless to say, the Athenians are seen as the most receptive for the Persian teaching in siege warfare: *e.g.* Barry Strauss, «Naval Battles and Sieges», in Brian Campbell – Lawrence A. Tritle (ed.), *The Oxford Handbook of Warfare in the Classical World*, Oxford University Press, Oxford 2013, pp. 238-239. For a detailed account of these hypotheses vd. Sarah C. Melville – Duncan J. Melville, «Observations on The Diffusion of Military Technology: Siege Warfare in the Near East and Greece», in Micah Ross (ed.), *From the Banks of the Euphrates. Studies in Honor of Alice Louise Slotsky*, Eisenbrauns, Winona Lake 2008 pp. 159-160. For a view of the Persians as "teachers" of siegecraft vd. now Hilmar Klinkott, «The Siege of Cities: Transfer of Poliorcetics from Mesopotamia to Greece?» in Robert Rollinger – Simonetta Ponchia (ed.), *The Intellectual Heritage of the Ancient Near East. Papers held at the 64th rencontre assyriologique international and the 12th Melammu Symposium, University of Innsbruck, July 16-20, 2018*, Austrian Academy of Sciences Press, Wien, 2023, 283-307.

39 Cfr. Yvon Garlan, *Recherches de Poliorcétique Grecque*, cit. pp. 131-134 ; Paul B. Kern, *Ancient Siege Warfare*, cit. p. 95; Duncan B. Campbell, *Besieged. Siege Warfare in the Ancient World*, Osprey Publishing, Oxford 2006, pp. 41-42. However, with the exception of Garlan, who offers a more balanced account, it should not forgotten that these scholars stress in their works the technological Greek primitivism.

The Peloponnesian War

The twenty-seven years of war between Athens, Sparta, and their respective allies witnessed a significant transformation in siege warfare and, no less importantly, in how scholars perceive it. Firstly, in contrast with previous periods, this phenomenon can be assessed quantitatively. As noted, if we merely count siege operations, with their multiple facets and with different targets, the total amounts to 101 episodes, compared to "only" 47 land battles[40]. This simple proportion should encourage more extensive research on sieges in Greek warfare, getting away from the traditional view of sieges as a separate form of war among Greek poleis. Needless to say, in what follows, we can only focus on a limited set of features that intersect with the outlook of previous periods. As we have already seen, sieges required substantial financial and human resources, which only Athens could really mobilise; it is difficult to envisage a Sicilian-style expedition originating outside the Athenian context[41]. In this respect, the siege of Potidaea encompasses the main facets of siege warfare during these years. Described at various points in the *Histories*, Thucydides highlights the protracted duration, in which the well-oiled circumvallation was followed by unsuccessful direct assaults, before the city finally capitulated, in the cold winter of 429[42]. As at Samos, the economic cost was extremely high, reaching 2.000 talents[43], and the distress for the Athenians entered the collective memory

40 Peter Krentz, «War», in in Philip Sabin – Hans van Wees – Michael Whitby (eds.), *The Cambridge History of Greek and Roman Warfare. Volume I: Greece, the Hellenistic World and the Rise of Rome*, Cambridge University Press, Cambridge 2007, p. 168. For the sieges during these years: cfr. Michael Seaman, *The Peloponnesian War and Its Sieges*, in Brian Campbell – Lawrence A. Tritle (ed.), *The Oxford Handbook of Warfare in the Classical World*, Oxford University Press, Oxford 2013, pp. 642-656.

41 On the economic prerequisites of the Athenian expedition against Syracuse: Lisa Kallet, *Money and the Corrosion of Power in Thucydides. The Sicilian Expedition and Its Aftermath*, University of California Press, Berkeley – Los Angeles – London 2001, pp. 21-84.

42 On this siege: John Lendon, *The Song of Wrath. The Peloponnesian War Begins*, Basic Books, London 2010, p. 97-100; on the consequences for the populations: Maria G. Xanthou, «Chalcidic connectivity between Sithonia and Pallene: Transmutations of epichoric identity and resilience in the long 5th and 4th c. BCE», in Laura C. Schmidt – Anja Rutter – Lutz Käppel, Oliver Nakoinz (ed.), *Mediterranean Connections. How the sea links people and transforms identities*, Sideston Press, Leiden 2023 pp. 40-43.

43 Thuc. 2.70.2; Isoc. 15.113: Matthew Trundle, «Coinage and the Transformation of Greek Warfare», in Garrett G. Fagan – Matthew Trundle (eds.), *New Perspectives on Ancient War-*

to such an extent that, years later, veterans still recalled the harshness of the winter outside the city walls[44]. Before reaching an agreement with the Athenian generals, the starvation inside the cities became so harsh that, as Thucydides disquietingly reports, there were episodes of cannibalism[45]. Starvation constituted one of the principal challenges faced by besieged communities, which were compelled to survive, even though, in the end, they had to negotiate a settlement with the besiegers to avoid being forced to capitulate by storming. It should be remembered that if the besiegers took the city by storm, the greatest dangers fell on the women and children, while adult males were usually killed[46]. Sieges, in this respect, represented one of the worst dark sides of warfare among Greek communities and our sources, from the Peloponnesian war onward, begin to delineate a consistent, dramatic account of several acts of violence inflicted upon the defeated[47].

Other poleis, however, could not afford comparable costs and were therefore forced to limit waste of time and resources and, no less importantly, avoid casualties. Siege warfare was a context that required the utmost inventiveness for both besiegers and defenders. One of their first strategies was often to search for potential traitors within the besieged community. The history of siege warfare, therefore, should devote significant attention to the political instability of Greek poleis, and to the ways in which besiegers sought to exploit pre-existent internal

fare, Leiden – Boston, Brill 2010, p. 240; David Rosenbloom, «Naval Service and Political Power in Classical Athens», cit. p. 52.

44 In this regard, the sources on the Socrates' soldier experience are icastic: Marco Bettalli, «Salvate il soldato Socrate», *Hormos. Ricerche di Storia Antica*, 9 (2017), pp. 1-7.

45 Thuc. 2.70.1: on cannibalism's episodes during sieges: Hendrick A. Wagner, «Der "heroische Kannibalismus". Die Möglichkeit einer Unmöglichkeit zwischen Exemplarität und Exzeptionalität», in S. Bauer – Ph. Brockkötter (ed.), Exemplarität und Exzeptionalität in der griechisch-römischen Antike, Göttingen 2022, pp. 279-295; Maurizio Ravallese, «Il morso del barbaro. Il cannibalismo e la storiografia degli assedi», *SPOLIA. Journal of Medieval Studies*, 20 (2023), pp. 469-523.

46 For the debate on violences after sieges: Hans van Wees, *Defeat and Destruction: The ethics of ancient Greek warfare*, in M. Linder – S. Tausend (ed.), *"Böser Krieg". Exzessive Gewald in der antiken Kriegführung und Strategien zu deren Vermeidung. Vorträge gehalten im Rahmen der 6. Grayer Althistorischen Adventgespräche am 21. Dezember 2006*, Grazer Universitätsverlag – Leykam – Karl-Franzens-Universität Graz, Graz 2011, pp. 69-110.

47 Vd. with previous debate Milan Prodanović, «Mass Enslavements and their Political and Social Dimensions in the Peloponnesian War», *Historia*, 74 (2025), pp. 388-427.

divisions and collaborate with so-called "fifth columns"[48]. When the besiegers disposed of substantial manpower, largely dependent upon the support of allies, and the conquest of the settlement appeared achievable, they could resort to direct assaults. Several communities had walls, but quite often these were in an advanced state of disrepair, which the besiegers exploited. Whenever the circuit wall was uniform and in good condition, at least the besiegers had to rely on various excamotages. The events at Plataea, especially the operations undertaken during the summer of 429, represented one of the most detailed accounts of a siege in fifth-century historiography[49]. These operations were concentrated on the southern wall of Platea. The Spartans and their allies raised a ramp, whose progress was slowed down – though not entirely halted – by the Plataeans. The defenders first opened a breach in the southern wall facing the ramp to remove earth, then dug a tunnel beneath the wall's foundations. As at Paros in 489, however, the besieged elevated an additional wall over the existing one, using material extracted from the neighbouring houses, in order to deter the resolute besiegers. The latter employed battering-rams – Thucydides' account does not suggest any particular innovation in this regard by the assailants, a sign that it was a widely employed instrument – but these were successfully neutralised by the Plataeans. As an extreme measure in the summer of 429, the Spartans waited for a favourable wind in order to intensify a fire they had kindled on the top of the ramp to destroy, in vain, the city. The Peloponnesian War attests two other assaults on fortified places, though not sieges in the strict sense, in which

48 On the social challenges during sieges: Angelos Chaniotis, «Greeks Under Siege. Challenges, Experiences and Emotions», in Brian Campbell – Lawrence A. Tritle (ed.), *The Oxford Handbook of Warfare in the Classical World*, Oxford University Press, Oxford 2013, pp. 441-443 for the references. In this respect, it is worth noting the image of the community shaped by Aineias Tacticus: vd. mostly Marco Bettalli, *Enea Tattico. La difesa di una città assediata (Poliorketika)*, ETS Editrice, Pisa 1990 pp. 16-23, cf. Maria Pretzler, «The *Polis* Falling Apart: Aineias Tacticus and *Stasis*», in Maria Pretzler – Nick Barley (ed.), *Brill's Companion to Aineias Tacticus*, Brill, Leiden – Boston 2017, pp. 146-165.

49 Thuc. 2.76-78: on this siege cfr. Paul B. Kern, «Military Technology and Ethical Values in Ancient Greek Warfare: The Siege of Plataea», *War & Society*, 6.2 (1988), pp. 1-20; Thierry Lucas, «Thucydide Poliorcète. Siège, Assaut et Guerre Urbaine au Ve Siècle», *Revue des Etudes Anciennes*, 123.1, pp. 115-138; Alessandro Carli, «ἦσαν δὲ οὐδὲ ἀδύνατοι, ὡς Λακεδαιμόνιοι, πολιορκεῖν. Gli Spartani e l'assedio di Platea, *Nuova Antologia Militare*, 3.10 (2022), pp. 31-75.

a rudimentary form of flamethrower was employed[50]. It is worth noting that this device did not appear in fourth-century sieges. In conclusion to these enterprises and countermeasures, Thucydides, with an authorial tone, observes that the Spartans and their allies made every conceivable effort to avoid the two interrelated facets of siege warfare: expenditure and encirclement. At least, even the most elaborated siege of the Peloponnesian War ended with a circumvallation that left the Plataeans gaunt, little more than skin and bone, and executed after their surrender.

The fourth century: Sicily and Macedonia as forerunners of the Hellenistic period?

After Athens' capitulation following months of terrible starvation, the history of siege warfare during the fourth century underwent significant developments in Sicily under the tyrant Dionysius I and his long-standing war against the Carthaginians[51]. For a historian who, at first glance, turns their attention to the Sicilians' siege operations, some distinctive traits emerge. First, it is important to consider the preliminary defensive measures undertaken to construct the city walls of Syracuse: having summoned a considerable workforce, which was organised into teams and, crucially, supervised by architects, the works were completed in only twenty days. As one might expect, Dionysius deployed financial incentives to "motivate" workers through prizes[52]. What emerges from Diodorus' account is a picture of meticulous military organisation illustrating the tyrant's receptivity to the strategic importance of fortifications. This attitude may be read as an indication of his future intentions regarding the strategic approach he would adopt in siege warfare[53].

50 Thuc. 4.100.2-3; 4.115.2: cfr. Robert J. Forbes, *Bitumen and Petroleum in Antiquity*, Brill, Leiden 1936, pp. 95-100; Adrienne Mayor, *Greek Fire, Poison Arrow, and Scorpion Bombs. Biological and Chemical Warfare in the Ancient World*, Overlook Duckworth, New York – London 2009, pp. 210-214 and *passim*.

51 For a prospect of all the Dionysus' wars: Stefania De Vido, *Le guerre di Sicilia*, Carocci, Roma 2013, pp. 33-49.

52 On these works: Richard J. Evans, *Syracuse in Antiquity. History and topography*, University of South Africa Press, Pretoria 2009, pp. 16-20 and pp. 24-26.

53 On his attention to warfare cfr. Marco Bettalli, «Dionisio I va alla Guerra», in Maria Intrieri (ed.), *Koinonia. Studi di storia antica offerti a Giovanna De Sensi Sestio*, Bretschneider,

In preparation for the war against the Carthaginians, his meticulous attention to detail was evident in the organisation of the troops and fleet. Indeed, the considerable economic resources in Dionysius's hands allowed Syracuse to assemble a contingent of troops unparalleled among the Greek poleis on the mainland: at his disposal were 80.000 men, 3.000 horsemen and 5000 transport ships. If we consider the literally "poor" cousins in Greece, their modest means, and the difficulties they faced in levying substantial troops for operations against settlements, then, at first glance, siege warfare in Sicily seems to belong to an entirely different world, even when compared with the campaigns conducted by the enterprising Athenians during the Pentecontaetia and the war against Sparta. In this context, the tyrant demonstrated a singular concern even for every material detail: the siege of Motya is paradigmatic in this regard[54]. When he advanced against the Phoenician city of Motya, Dionysius was able to deploy a large number of soldiers for assaults, which allowed him to consider various tactical options without excessive regard for the human cost. This does not mean that he was indifferent to his human resources or to their preservation; rather, it is likely that the substantial manpower reserves enabled him to assume an appropriate degree of risk. In contrast with the previous periods we have covered, sources emphasise just how costly the assaults were in terms of human lives, both for the besiegers and the defenders. Following an initial inspection with his engineers, Dionysius deployed several engines against the defences of Motya, including the tried and tested battering rams, as well as mobile towers pushed up against the walls. Just the towers made their entrance in the Greek warfare[55] and were constructed slightly higher than the city walls to provide access to assailants. Apparently, according to Diodorus, the catapult made its debut in Greek warfare during this siege. However, it is more likely that on this occasion the besiegers

Roma, 2018, pp. 187-194; Joshua R. Hall, *The Western Greeks and the "Greek Warfare"*, in Roel Konijnendijk – Cezary Kucewicz – Matthew Lloyd (ed.), *Brill's Companion to Greek Land Warfare Beyond the Phalanx*, Brill, Leiden – Boston 2021, pp. 271-273 with further bibliography.

54 Diod. 14.48-49; 51-53: cfr. Alessandra Coppola, *Dionisio il Grande*, Salerno Editrice, Roma 2022, pp. 60-63.

55 For the debate vd. Duncan B. Campbell, *Besieged. Siege Warfare*, cit. pp. 47-54; cfr. Yvon Garlan, *Recherches de Poliorcétique Grecque*, cit. pp. 164-169.

used a sort of crossbow equipped with a windlass and an appropriate support[56].

The techniques of siege warfare during the tyranny of Dionysius are exemplified by the operations conducted on the mainland by Philip II, albeit with some differences. The approach of the father of Alexander the Great to siegecraft is often regarded as a precursor to the Hellenistic period, characterised by a systematic organisation of logistics, personnel, and consistent utilisation of siege engines[57]. Nonetheless, a genuine turning point is more appropriately attributed to his son and his legacy, a topic beyond the scope of this chapter[58]. Considering how closely Philip aligned with his era, yet distinguished himself by associating with Dionysius of Syracuse, the case of Amphipolis, captured in 357, needs to be examined. As Diodorus explicitly states, Philip II employed battering rams along a section of the circuit wall, facilitating the storming of the city, an achievement likely to have enhanced his reputation in siegecraft[59]. Moreover, during his reign, siege engines became more complex but were not unfailing. At Perinthus in 341[60], for instance, Philip utilised towers taller than the enemy's walls - an approach quite differing from Dionysius at Motya as we have seen - allowing his forces to assault the defenders more effectively. Another element aligning Philip with the Syracusan tyrant was the employment of catapults, yet, in contrast to the "simple" crossbows experimented with in Sicily, his engineers developed a torsion-powered machine: although such ma-

56 Diod. 14.42: for the debate on the catapult vd. Thierry Lucas, «Early Greek Catapults and "First-Generation Artillery Towers"», *Historia. Zeitschrift für Alte Geschichte*, 71.2 (2022), pp. 130-149 who suggests that the early catapults were a sort of experimental engines. According to David Whitehead – P. H. Blyth, *Athenaeus Mechanicus,* On Machines*, (Περὶ μηχανημάτων)*, Franz Steiner Verlag, Stuttgart 2004, pp. 186-187, even the spectacular nature of these machines, their effectiveness can be questioned and it is likely they had a greater impact on the enemies' morale.

57 Cfr. Yvon Garlan, *Recherches de Poliorcétique Grecque*, cit. pp. 202-244; Paul B. Kern, *Ancient Siege Warfare*, cit. pp. 197-201.

58 For the entire debate vd. Elizabeth Baynham, «The Sieges of Philip and Alexander», in Edward M. Anson (ed.), *Brill's Companion to the Campaigns of Philip II and Alexander the Great*, Brill, Leiden – Boston 2025, pp. 113-133.

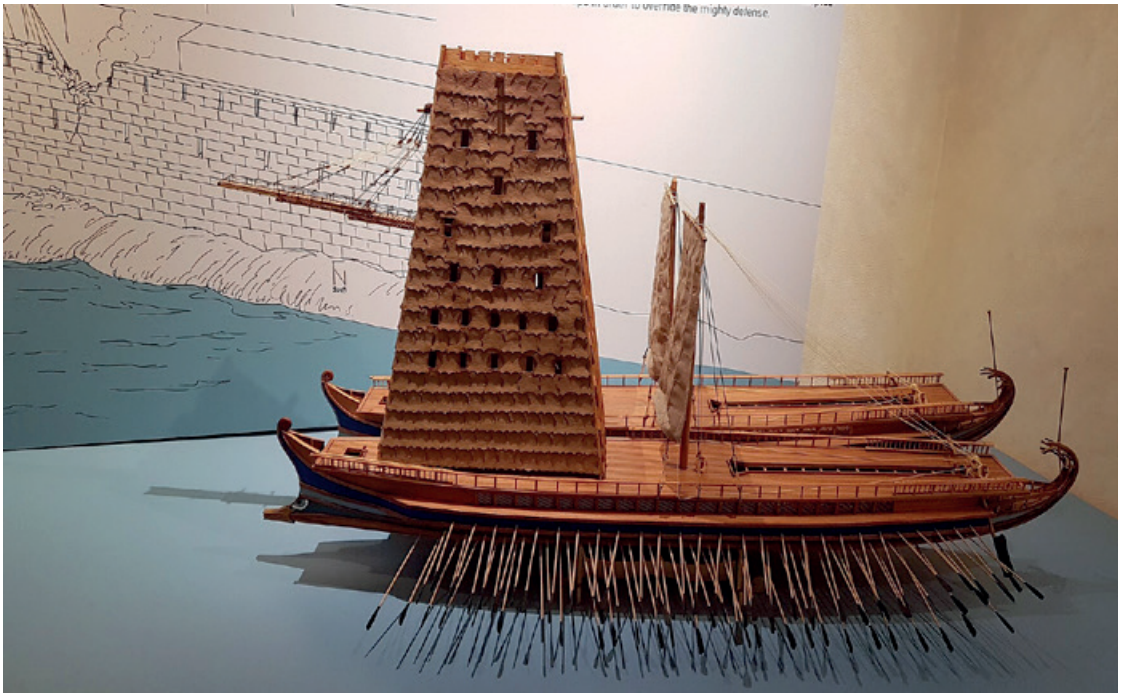
59 Diod. 16.8.2: David Whitehead, «Siege Warfare», pp. 109-111.

60 Diod. 16.75: for the importance of this episode in ancient historiography vd. Giovanni Parmeggiani, «L'assedio di Perinto (341/0 a.C.) nella percezione dei politici e degli storici contemporanei e la conclusione delle *Storie* di Eforo», in *Ktèma : civilisations de l'Orient, de la Grèce et de Rome antiques*, 39 (2014), pp. 303-314.

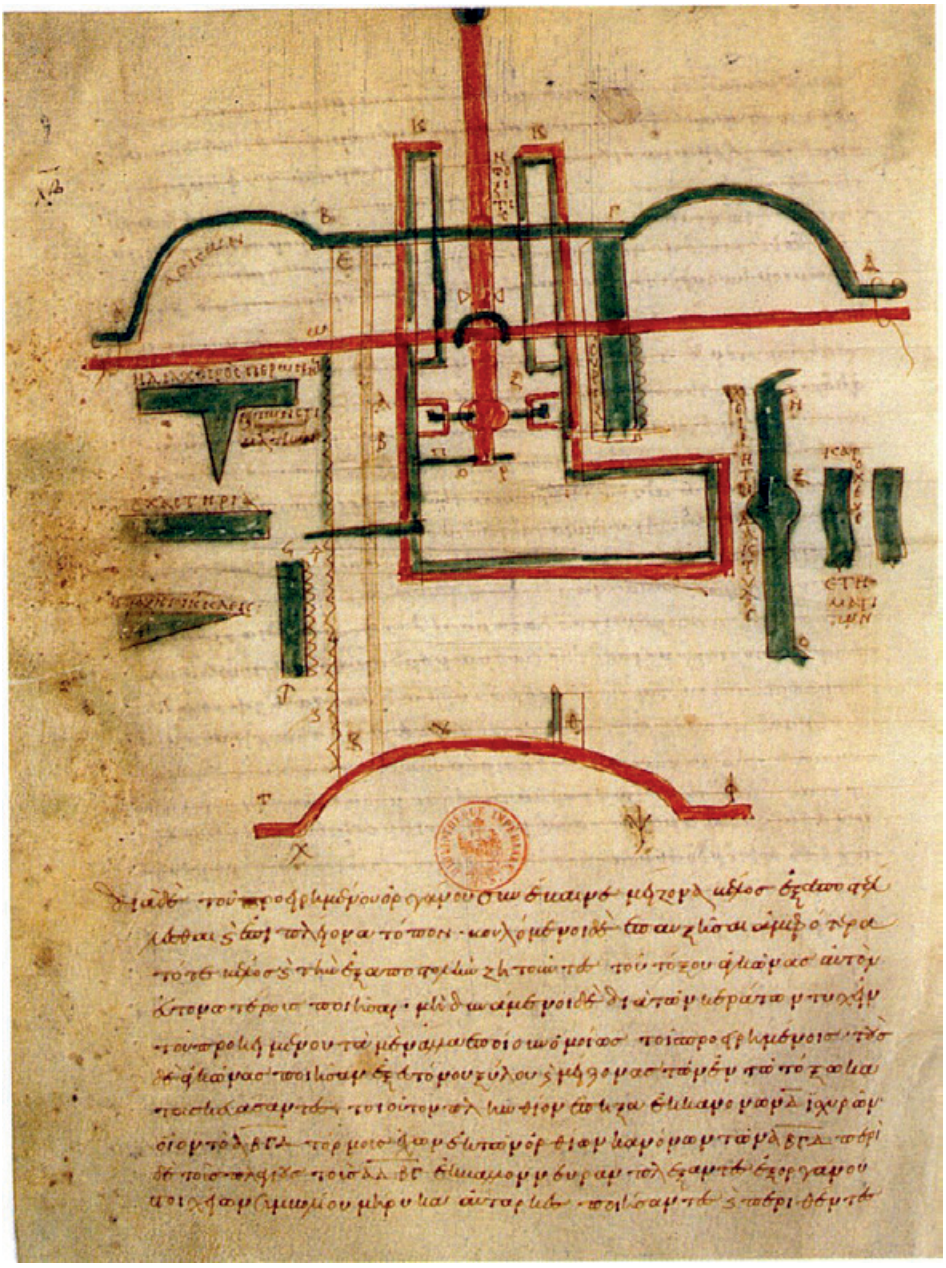
Tetradrachm 301-295 BCE of Demetrios Poliorcetes.
CNG coins. Wikimedia Commons

chinery was no longer a complete novelty by then, defenders did not always take adequate technological countermeasures[61]. However, if we consider this in the context of the sieges of previous decades, Philip II proved particularly keen to use money and, where possible, to gain traitors to hand over the city to him. We might say that the figure of Philip exemplifies very well a pivotal period in the history of sieges: the Greek communities were faced with a ruler of immense wealth – which only grew with the war proceeds – who could deploy siege techniques but who, at the same time, had realised that the tried-and-tested betrayals – given that the polis was an unstable entity – were still a valuable tool.

61 Vd. for previous bibliography David Whitehead, «Siege Warfare», p. 110Thierry Lucas, «Early Greek Catapults», cit. p. 139.



Naval Helépolis. Two quinqueremes having a Helépolis on their decks. Study-Construction: D. Maras. Photo Gre regiment 2018. Wikimedia Commons



Hero of Alexandria, Belopoiika 5: Design drawing showing a smaller cannon. Manuscript Paris, Bibliothèque Nationale, Suppl. graec. 607, fol. 47v.Wikimedia Commons

Modern recreation of the Alesia fortifications, featuring rows of stakes in front of a moat, a high banked approach, and regular towers for Roman sentries

Remnants of Camp F, one of several legionary camps just outside the circumvallation wall around Masada. (72-73 CE). By David Shankbone. Wikimedia Commons

Remnants of Camp F, one of several legionary camps just outside the circumvallation wall around Masada. (72-73 CE). By David Shankbone. Wikimedia Commons

Quartered Safe Out There
The Roman Army on the Frontiers

by Jorit Wintjes

I. Introduction – at the edge of empire

Early in AD 236, an important message reached the Roman fortlet of Didymoi on the road from Koptos in the Nile valley to the Red Sea harbour of Berenike. Emperor Maximinus, who had obtained the purple just a year earlier during the tumultuous events surrounding the murder of his predecessor Severus Alexander, had elevated his son Maximus to the rank of *caesar*, thereby designating Maximus as his successor.[1] Letters had been sent out to the provincial governors with this important piece of news, one of which had reached Egypt. The *praefectus* of Egypt, a man called Mevius Honoratianus,[2] then forwarded the letter to all unit commanders, who had to ensure that the new *caesar* would be included in all relevant rituals such as the military oath, the *sacramentum*; once the letter had reached Koptos, a copy was sent out to Didymoi. On its way the letter had gained instructions, either added by the office of the *praefectus* or at Koptos: the recipients should take care "to perform inaugural sacrifices and acclamations and to put the letters on display".[3]

In a larger fort such as Koptos "putting on display" might have meant setting up an inscription. Didymoi, however, was one of a large number of small fortlets guarding wells along the streets connecting the ports of Myos Hormos and Berenike with the Nile valley, garrisoned by a few dozen soldiers at most with

1 For an overview over these events see John Drinkwater, "Maximinus to Diocletian and the 'Crisis'." In *The Cambridge Ancient History XII: The Crisis of Empire*, edited by Alan K. Bowman, Peter Garnsey and Averil Cameron (Cambridge: Cambridge University Press, 2005), pp. 28-66; on Didymoi itself see Hélène Cuvigny (ed.), *Didymoi. Une garnison romaine dans le désert Oriental d'Égypte. Praesidia du désert de Bérénice IV. II. Les textes* (Cairo: Institut français d'Archéologie orientale, 2012).

2 On Honoratianus see PIR M 576.

3 *O.Did.* 29, 10-12.

a low-ranking *curator* in charge, so if it was put up on display at all it is likely that it was simply copied onto a piece of wood. In the grand scheme of things, Didymoi was about as insignificant as Roman army outposts got. Yet the letter is important in two respects: it shows the long reach of both imperial and army administration, sending down information even to small units on detachment duty. And, even more important, it highlights the importance of the army on the frontiers for the emperor: ensuring that the news of a new heir to the imperial purple was transmitted down to the last man in a remote outpost in the Eastern Desert was crucial as the very survival of any Roman emperor depended on the loyalty of the army to the imperial family. From the perspective of someone living in Rome most of the army may have been out of sight on the frontiers; politically, however, no emperor could allow it to fall out of mind. The army's political role in turn raised the importance of the provinces in general and the frontier zones in particular, as it was in these where most of the army could be found. Around AD 100 Tacitus noted that already during the Year of the Four Emperors in AD 69 the *arcanum imperii*, the innermost secret of imperial rule, had been laid open, which according to him was that the emperor could be "made" elsewhere, that is outside Rome.[4] This "elsewhere" was the frontiers of the empire. It is therefore important to understand Roman frontiers not merely as structures designed to ward off enemies; they were also – and in some periods probably primarily – a focal point of Roman politics.

Of course, apart from the military function of controlling access to the empire and deterring any enemies, and the political importance of the soldiers tasked with doing so there were also the realities of living in the frontier zone. About a century before the garrison of Didymoi was informed of Maximus' elevation to *caesar*, Lucius, a *decurio* in charge of 30 cavalrymen belonging to the garrison of Vindolanda in Britain was sent a consignment of 50 oysters by an acquaintance, or rather, they were passed on to him, as his acquaintance claimed to have been sent the oysters himself by a friend.[5] Setting aside the question how well preserved these second-hand oysters were when they eventually arrived with the *decurio*,[6] this example of supplementing standard army rations with food of

4 Tac. *hist*. 1.4.

5 *Tab.Vindol.* 299.

6 The editors suggested the oysters may have come from the Thames estuary, see Alan Bowman and David Thomas, *The Vindolanda Writing Tablets (tabulae Vindolandenses II)* (Lon-

a more refined nature highlights how the Roman army on the frontiers was not only a military and political instrument but also a recipient of a huge variety of goods and services from both regional and empire-wide sources.

II. The Roman Army at the frontier

The vast majority of the Roman army of the early and high principate, which was made up of 28 to 33 legions and auxiliary units of about equal strength for a total of perhaps around 300,000 men, was stationed in the frontier provinces; exceptions included a legion stationed in northern Spain, the imperial guard originally spread out in Italy but concentrated in Rome from the early 30s onwards, and naval forces of significant size in Misenum and Ravenna, mainly tasked with defending Italy against potential usurpers raising armies and fleets elsewhere in the Mediterranean.[7]

The army had a significant impact on the frontier zones where it was stationed. It constructed and maintained complex networks of military infrastructure that included roads, linear barriers, chains of watchtowers, fortlets and forts. While Roman military architecture must have left a lasting impression on the local population and provides much of the material evidence for the present-day observer, those living in the frontier regions were even more affected in other ways by the presence of the Roman army. On a very basic level, the establishment of a Roman garrison in a frontier zone meant an influx of not only soldiers but also civilians in sizeable numbers.[8] Non-combatants like muleteers or stable hands belonged to Roman army units as well, and while there was a ban on official marriages, it is clear from the surviving evidence that many Roman soldiers had families, some of whom apparently living inside the fort walls; veterans also settled near Roman garrisons in some numbers. After a generation, then, a

don: British Museum Press, 1994), p. 273.

7 On the general organization of the Roman army of the early and high principate see Kate Gilliver, "The Augustan Reform and the Structure of the Imperial Army." In *A Companion to the Roman Army*, edited by Paul Erdkamp (London: Blackwell, 2007), pp. 181-200., pp. 181-200.

8 While exact numbers are impossible to establish it has been suggested for Britain that around 20,000 soldiers in the frontier zone were accompanied by 20-30,000 non-combatants and civilians, ranging from family members to slaves (James Bruhn and Nick Hodgson, "The Social and Economic Impact of Hadrian's Wall on the Frontier Zone in Britain," *Britannia* 53 (2022), pp. 125-57); this is, one has to say, a conservative estimate, the number may well have been significantly higher.

military community had developed; quite a few of its members will have been well-off, and all the soldiers will at least have been aware of their importance to the emperor – even if they were temporarily posted to fortified wells like the fortlet at Didymoi.

Beyond demographics the army must also have had a considerable influence on local economies. Its appetite for anything from food to building materials to firewood was enormous, as was its need for animals. To take but one example, surviving evidence shows that the army was acutely aware of the importance of horses and as a result kept track of them rather meticulously, with a paper (or rather papyrus) trail associated with each individual horse.[9] One would assume that when during the preparation for large campaigns significant numbers of pack and draught animals had to be acquired, fortunes could be made by selling mules and oxen to the army. In addition, local economies would have cared for the individual needs of the soldiers, which, as seen above, could include goods not readily available locally. An undated label from Vindolanda once belonged to a small amphora of *picatum*, a high-quality wine from the Rhone valley,[10] and some evidence may suggest premium quality *garum* fish sauce produced in southern Lusitania was brought to Vindolanda as well.[11] These examples show that Roman army garrisons in the frontier zones were at the end of logistical networks connecting them with regions throughout the empire and capable of moving large quantities of goods regularly and, one would assume, profitably for everybody involved.

The army also had a significant influence on local ecosystems, something that has gained the attention it deserves only comparatively recently. The establishment of Roman army infrastructure meant large-scale building activities, which in turn created a significant need for building materials; in north-western Europe high-quality timber must have been a valuable commodity. And while *decurio* Lucius may have flushed down his second-hand oysters raw with a good helping of wine and more than only a sprinkling of *garum*,[12] at some point he

9 See for example *P.Dur.* 56; for a discussion see Robert O. Fink, *Roman Military Records on Papyrus* (Cleveland: Case Western Reserve University Press, 1971), pp. 403-405.

10 Brit. 54.28.

11 RIB 2492.20.

12 In this context it is worth mentioning that recent research analysing from that very fort at Vindolanda suggests a fairly high rate of infection with parasites causing diarrhoea among the

will have felt the need for a cooked meal as well, if only to calm his stomach.[13] Cooking, heating and many of the manufacturing activities inside a Roman fort required a constant supply of large amounts of firewood; its collection must have made an impact on the landscape. Furthermore, where local communities prior to the Roman army's arrival were largely relying on subsistence farming, the presence of the army now brought about significant changes in agriculture including the introduction of new crops. Over time, large farms (so-called villas) developed near the frontier zones, with much of their production probably bought up by the army.[14]

III. How did the frontier work?

Popular imagination often has the army trying to valiantly defend the frontier against invaders with ill intent. In some cases such as Britain the Roman soldiers' task was made somewhat easier as there was a proper wall from which to fight the enemy crashing against it in waves of unkempt barbarians with questionable standards of personal hygiene.

In reality, however, the Roman army did nothing of the sort. In terms of military operations Roman frontier zones did not serve as tactical positions from which the Roman army fought its enemies; instead, their primary function was to serve as operational bases for the army, allowing for rapid concentration in case a kinetic reaction to an enemy incursion was needed. While Roman garrisons were indeed called *castra*, forts, their defensive value was in fact highly limited throughout the early and high empire; with only small numbers of towers flush with the walls, they were not designed to withstand sieges.[15] For the security of

soldiers, see Marissa L. Ledger, Patrick G. Flammer, Adrian L. Smith, Andrew Birley and Piers D. Mitchell, "Parasite infections at the Roman fort of Vindolanda by Hadrian's Wall, UK," In *Parasitology* (2025), pp. 1–9.

13 Ancient medicine suggested *ptisan*, a barley gruel carefully boiled for quite a long time against stomach aches and digestive difficulties (Hippocr. *acut*. 5.5).

14 On the general impact of the Roman army on local agriculture see Oliver Stoll, "Armee und Agrarwirtschaft. Die „Stationen" vor dem norisch-pannonischen Limes und die Landwirtschaft im „Freien Germanien"." In *Römisches Heer und Gesellschaft. Gesammelte Beiträge 1991 – 1999, edited by Oliver Stoll* (Stuttgart: Franz Steiner 2001), pp. 452–511; the most recent review of villa development in a frontier zone can be found in Bruhn and Hodgson, "Social and Economic Impact".

15 The most famous example for a Roman fort being inadequately fortified is the legionary for-

the frontier provinces, the Romans did not rely on fortifications. Rather, Roman military installations in the frontier zones provided the infrastructure necessary for dissuading anyone from raiding the provinces. In this context, deterrence did not necessarily mean preventing an enemy from plundering villages and cities inside the province; rather, it meant threatening to stage a punitive expedition afterwards which was likely to end with the perpetrators ending up dead in a ditch.

Closely related to serving as an operational base for the Roman army was a second important function of the frontier zone: controlling movement inside that zone and monitoring activities outside it. The latter will have included regular visits to local chieftains beyond the border; it is plausible that the Roman army was well aware of what happened in a zone of surveillance several days' ride deep. Roman influence will have reached even further out; in the case of Scotland hacksilver hoards like the Dairsie hoard found in 2017 indicate diplomatic activities of some sort over a significant distance.[16] As for controlling movement within the frontier zone, evidence from Egypt allows a rare insight into the day-to-day operations of the Roman army. In the Eastern desert, the frontier zone extended from the Red Sea harbours to the Nile valley. The roads connecting both were controlled by the army, which also guarded all the wells along the roads. Anyone who wanted to use the road network had to pay a toll in order to get a pass from a *quintanensis*, a Roman soldier charged with collecting the toll.[17] A price list from Koptos dated to around AD 90 still survives,[18] its first entry highlighting the reason for the particular attention the Roman army paid to the road network: a navigator capable of sailing to India had to pay five

tress at Vetera which was successfully attacked by Batavians during the Batavian Revolt of AD 69, see Tac. *hist*. 4.23.1; fort design would change during the 3rd century, and by the 4th century newly built forts looked very different, being usually festooned with artillery platforms and high towers protruding from the walls.

16 On these hacksilver hoards see Fraser Hunter and Kenneth Painter. "Hacksilver in the Late Roman and Early Medieval world – economics, frontier politics and imperial legacies." In *Social Dynamics in the Northwest Frontiers of the Late Roman Empire Beyond Transformation or Decline*, edited by Nico Roymans, Stijn Heeren and Wim de Clercq, 81-96 (Amsterdam: Amsterdam University Press, 2017), pp. 81-96.

17 See eg *O.Ber.* 51; on the *quintanenses* see Dario Nappo and Andrea Zerbini. "On the Fringe: Trade and Taxation in the Egyptian Eastern Desert." In *Frontiers in the Roman World. Proceedings of the Ninth Workshop of the International Network Impact of Empire (Durham, 16-19 April 2009)*, edited by Olivier Hekster and Ted Kaizer (Leiden: Brill, 2011), pp. 61-77.

18 OGIS 2.674.

drachmae.[19] It was the Indian trade that made the harbours in the Red Sea and, as a consequence, their connection to the Nile valley and the province proper so important. While few other frontiers could match the economic importance of a place like Berenike, the Roman army will have exerted a similar level of control – though not one that was as profitable as in Egypt – elsewhere. Controlling movement in the frontier zone also served to prevent cattle rustling and other forms of minor disturbances, creating a space where one could enjoy the *pax Romana*, provided one was in good graces with the Roman army. If not, the presence of the army could be experienced as somewhat less peaceful, as an unnamed "man from overseas" had to experience at the beginning of the 2nd century, who complained about having been beaten with rods despite being, obviously, quite innocent of it all.[20]

Apart from being used as an operational basis for the Roman army and a means to control movement of persons and goods into and out of the empire the frontiers also served as an important zone of contact with imperial authority. The army was a direct extension of the emperor right down to the smallest fortlet, as shown above by the example from Didymoi. As a result, any foreigner approaching the frontier had to interact with imperial authorities, represented in forts by the *imagines* of the emperor and his heir and in smaller offices possibly by paintings such as the so-called Severan Tondo, a depiction of Septimius Severus, his wife and his two sons from Egypt.[21] The frontier, then, was a symbol not merely of Roman power but of the reach of the emperor himself.

The structural components of the Roman frontiers mirrored these three functions. While frontiers could differ considerably depending on a variety of factors including local topography and availability of building materials, they all shared common elements related to their primary functions. At the core of each frontier zone, which by the 2nd century at latest appears to have been called *limes* by the Romans, lay a single road or a road network. This allowed not only to move forces around quickly, either in reaction to a threat or in preparation for a cam-

19 OGIS 2.674, 9-10.

20 *Tab.Vindol.* 344; due to the fragmentary state of the tablet the accusations that led to the unfortunate incident are unknown; perhaps he had delivered bad oysters?

21 Anna Marguerite McCann, *The Portraits of Septimius Severus (A.D. 193-211)* (Rome: American Academy, 1968), pp. 79-80 and fig. 4.

paign, it also improved logistics considerably by making the use of wheel-based transport easier. Furthermore, it channelled movement, particularly in difficult terrain such as in Egypt's Eastern Desert, which in turn allowed for an easier control of movement. On long stretches of the Rhine and the Danube the river itself served as the main road; the logistical importance of waterways had been discovered by the Roman army already during its early forays into Germany in the Augustan period.[22]

At some points along the road or in the road network there were garrisons. In some cases, such as in England or Egypt, garrisons of auxiliary units were established in the frontier zone, while the legions were located in the hinterland; in England the legion nearest to the actual frontier was stationed in York, while the Egyptian legions were stationed outside Alexandria; elsewhere, such as on the Danube, legionary garrisons were located inside the frontier zone as well. Roman forts could differ significantly in detail, but all forts housing a whole unit shared – apart from accommodation for the unit personnel – three types of buildings highlighting their function as operational bases: *horrea* (granaries), *fabricae* (workshops) and *principia* (HQ facilities).[23] If properly maintained granaries will have housed several months' worth of grain and other foodstuffs, providing the unit with sufficient supplies to quickly prepare for a campaign. Workshops were responsible for all the maintenance required for buildings and equipment; they also produced equipment of varying degrees of complexity ranging from engineer tools to artillery pieces as well as ammunition for the latter and other expendable ranged weapons.[24] HQ facilities not only consisted of a room where the unit's standards were kept and a strong room for the unit's

22 On the importance of shipborne logistics for these early campaigns see Jorit Wintjes, *Die römische Armee auf dem Oceanus* (Leiden: Brill, 2020), pp. 58-81.

23 On the different elements of Roman forts see Anne Johnson, *Römische Kastelle des 1. und 2. Jahrhunderts n. Chr. In Britannien und in den germanischen Provinzen des Römerreiches (bearbeitet von Dietwulf Baatz)* (Mainz: Philip von Zabern, 1987).

24 Two famous examples are a 3rd century pioneer tool found at the Harzhorn battlefield produced by *legio III Flavia felix* (Michael Geschwinde, Michael Meyer, Petra Lönne and Torben Schatte (eds.), *Harzhorn: Die Archäologie eines germanisch-römischen Kampfplatzes des 3. Jahrhundert n. Chr.* (Wiesbaden: Reichert, 2025), pp. 413-415) and a fragment of a 1st century artillery piece produced by *legio III Macedonica* that was found outside Cremona (Dietwulf Baatz, "Ein Katapult der legio IV Macedonica aus Cremona," *Mitteilungen des Deutschen Archäologischen Instituts. Römische Abteilung* 87 (1980), pp. 283–299).

war chest, they also crucially included the unit's offices and archive. Roman military bookkeeping was meticulous, to say the least; strength reports showed how many men were absent on detached duty or ill,[25] officers had to check on their soldiers' equipment regularly,[26] and receipts could be given out in quadruplicate.[27] What sounds suspiciously similar to bureaucratic excesses of a more recent age may in fact have given Roman commanders an important advantage in that they could easily find out how many men, horses and artillery pieces they could put into the field at any given moment.

Typologically distinct from forts housing complete units are fortlets, which in the frontier zone could often be found in between larger forts. While they would invariably differ in shape and specific function, with some such as the milecastles on Hadrian's Wall integrated into a larger system, and others guarding a specific piece of topography like a pass or, in the case of the *praesidia* in the Eastern Desert, a well, they all shared two characteristics: one, they were small, usually designed for a few dozen men at most; and two, while they were permanently manned, their garrisons were formed by detachments sent out from larger forts. It is unknown how long one had to spend on detached duty, and it is quite possible that practices differed considerably depending not only on the province but on the officer commanding the parent unit. But while Roman army units could spend decades if not centuries in one and the same place, there was much more fluctuation in fortlets which were constructed with limited effort.

The smallest military structure found in Roman frontier zones was the turret. Like fortlets, turrets could vary considerably in construction and form: they either formed chains making it possible to pass on messages by signalling as

25 Perhaps the most famous example from the northern frontiers is *Tab.Vindol.* 154, a strength report of the First Cohort of Tungrians stationed at the fort of Vindolanda dating to the mid-90s; at the time of the reporting, of a total strength of 752 men 456 were on detached duties and not present in the fort; of the remaining 296 men 31 were unfit for service, leaving the unit commander with 265 men at his disposal.

26 See eg *Tab.Carlisle* 16; see Roger S. O. Tomlin, "Roman Manuscripts from Carlisle: The Ink-Written Tablets," *Britannia* 29 (1998), pp. 31-84.

27 *P.Amherst* 107.15; see Bernard P. Grenfell and Arthur S. Hunt (ed.), *The Amherst Papyri, Being an account of the Greek papyri in the collection of the right hon. Lord Amherst of Hackney, F.S.A at Didlington Hall, Norfolk. Classical fragments and documents of the Ptolemaic, Roman and Byzantine periods. With an appendix containing additional theological fragments* (London: Henry Frowde, 1901), p. 134.

for example in the Germanic frontier zones, or they were erected as individual watchtowers, usually in conspicuous places. Turrets and watchtowers were manned only by a handful of soldiers at most, and while hearths have been found in turrets on Hadrian's Wall which may suggest longer-term occupation one would assume that detachments usually spent only a couple of days in them.[28] Larger turrets called *burgi* appeared from the 3rd century onwards, somewhat blurring the distinction between a turret and a fortlet.

Finally, one additional element requires mentioning that is not present in all frontier zones – a man-made linear barrier. On the river frontiers such an element was not necessary, the Rhine and the Danube serving as both an eminent barrier and an autobahn-like line of communication at the same time. In Britain, Hadrian's Wall is the earliest and possibly most elaborate large-scale barrier comprising a stone wall, a ditch and a sequence of earthen rampart, ditch and earthen rampart to the rear of the stone wall. On the Germanic frontier a palisade with a rampart and a ditch served as a linear barrier; the Antonine Wall built in the 140s in Britain was of a broadly similar design, while some stretches of the Germanic palisade were replaced in the late 2nd century by a simple stone wall. Earthen ramparts were extensively used in Dacia, and in Tripolitania shorter stretches of linear barriers served to block Wadis. The frontier zones in the East did not have linear barriers on a larger scale, nor did the Eastern Desert – though in the latter case it could be argued that the sea served as the linear barrier in much the same way as the Rhine and the Danube did.

While forts, fortlets, turrets and roads could be found in all Roman frontier zones, and linear barriers in most of them, forming frontier systems, it is important to bear in mind that these systems were the result of extended periods of development rather than being designed as a whole. Hadrian's Wall is somewhat unusual in that it was not only initially designed as a complete system but also underwent only one major design change while it was still being built.[29] Usually, frontier zones were flexible enough to react to changes beyond the frontiers or in imperial policy.

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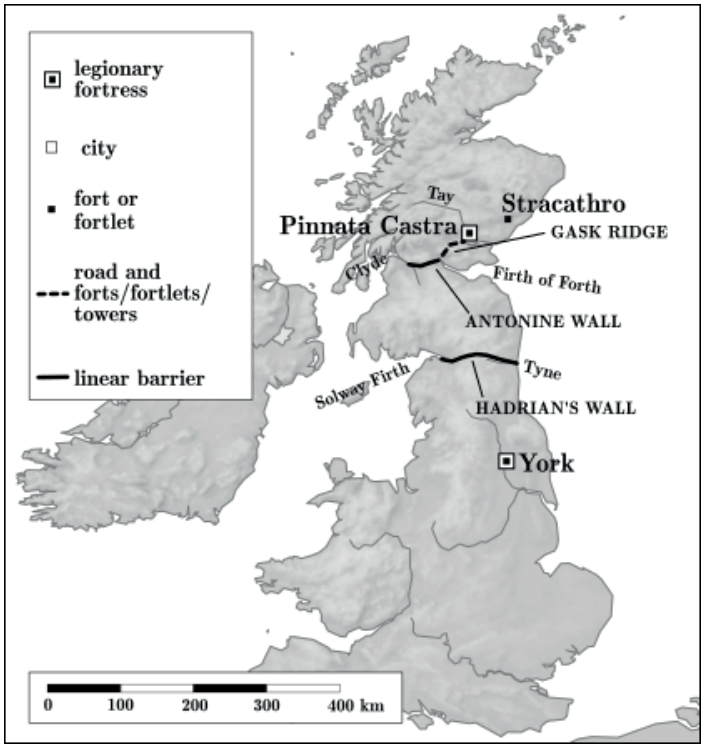
28 David J. Breeze and Brian Dobson, *Hadrian's Wall (fourth edition)* (London: Penguin, 2000), pp. 37-39.

29 Antonine's Wall also underwent no major changes which is, however, not surprising as it was given up after only a few decades.

IV. Britain

For nearly a century, Britain lay at the edge of the Roman world. Caesar had first launched a reinforced reconnaissance mission in 55 BC followed by a major invasion in the following year which established indirect Roman rule over southern Britain, at least for some time. In AD 43, Emperor Claudius decided to extend direct Roman rule and launched another invasion, throwing an army of 40,000 men across the channel. In the following three decades Roman rule rapidly extended northwards, and by the 70s the Romans were pushing into Scotland. Under the command of Roman governor Agricola Roman forces advanced through the Lowlands, crossed the Forth-Clyde line and the River Tay, fought and won a climactic battle against what must have been an alliance of tribes somewhere in northeastern Scotland.



map 1 – frontier systems In Roman Britain.[30]

30 Maps 1 to 6 show only those place names that mentioned in the text; all maps by the author.

As a result of their success garrisons were established north of the River Tay, forming the first frontier system in Roman Britain. A line of smaller forts ran from Stracathro to the southwest, with a legionary fortress located at Inchtuthil (Pinnata Castra) roughly in the middle of that line, while a road connecting some of the forts ran on the Gask Ridge, with a series of watchtowers alongside it. Very little evidence for the operation of this first frontier system survives; it was only in service for a few years before events on the Danube led to emperor Domitian abandoning Scotland and moving units from Britain back to the continent.[31]

Roman forces fell back to the Solway-Tyne line, where a new frontier was established by building a road, commonly called the Stanegate, and putting a number of forts for auxiliary units alongside it. Established in the 80s, the Stanegate frontier was in operation for about 40 years.[32]

When emperor Hadrian visited the province in AD 122 , a new frontier system was established on the Solway-Tyne-line that surpassed any already existing system in scale: a massive wall – the eastern part in stone, the western part in turf – was to be built, with integrated fortlets in regular intervals of one Roman mile, the so-called milecastles, allowing movement through the wall, and watchtowers also integrated into the wall, two regularly spaced out between two fortlets. In front of the wall was a ditch, behind the wall ran a massive earthen barrier, the so-called *vallum*, a sequence of earthen rampart, ditch and earthen rampart. Originally, these installations were apparently to be manned by soldiers from auxiliary forts lying behind the wall, but halfway through its construction a major design change was put into effect, and 16 forts were moved up to the wall itself. Hadrian's Wall, as the new frontier system was to be called, therefore included four different components of Roman frontiers – a linear barrier, forts, fortlets and turrets – in one single unified structure.[33]

The wall was hardly – or more probably not at all – finished when under

31 On the Gask Ridge installations see David Woolliscroft and Birgitta Hoffmann, *The First Frontier. Rome in the North of Scotland* (Stroud: Tempus 2006).

32 For an overview of the Stanegate frontier see Eric Birley, *Research on Hadrian's Wall* (Kendall: Titus Wilson, 1961), pp. 132-150 and Breeze and Dobson, *Hadrian's Wall*, pp. 16-24.

33 The literature on Hadrian's Wall is vast; the standard overview is still Breeze and Dobson, *Hadrian's Wall*.

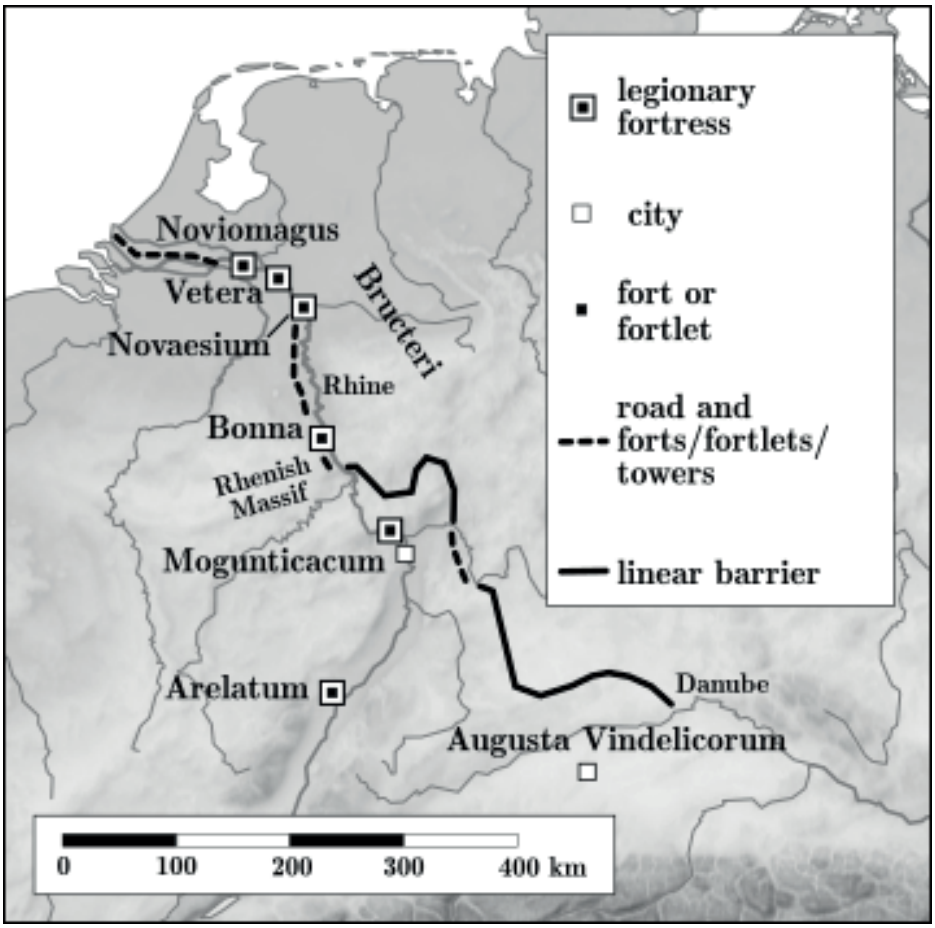
emperor Antoninus Pius the Romans pushed again into Scotland. The Lowlands were once again occupied and a new wall erected on the Forth-Clyde line which is now known as the Antonine Wall. Structurally different from Hadrian's Wall in that it was built of earth and timber and had smaller forts added to it, it nevertheless combined a linear barrier, larger forts, smaller fortlets and turrets in a similar way as one single structure. Also, the linear barriers shared a common feature not present on that scale elsewhere in the Roman world: they were fronted by a massive ditch, 30 feet wide in the case of Hadrian's Wall and 40 feet on the Antonine Wall;[34] elsewhere, ditches, if present, where much smaller affairs.

While the exact chronology is fraught with difficulties, the Romans had given up the Antonine Wall by the 180s at latest, falling back on Hadrian's Wall which remained the frontier zone of the Roman province (and later provinces) of Britain until the end of Roman rule.

V. Germany and Raetia

While Caesar first crossed the Rhine in 55 BC, the first permanent Roman presence on the Rhine dates to about 19 BC, when Roman forces established garrisons in Nijmegen (Noviomagus) and Neuss (Novaesium). The following years saw conflicts with Germanic tribes living across the Rhine slowly escalate into large-scale campaigning aimed at controlling all of northern Germany up to the Elbe, and from 7 BC onwards a new province appears to have emerged. The Roman defeat in the Battle of the Teutoburg Forest in AD 9, however, put a rather violent end to it, and while in the following years large campaigns again brought Roman forces to the Elbe, emperor Tiberius eventually decided to end attempts at regaining control over Germany east of the Rhine. In the following decades, the Roman army established a frontier zone along the Rhine, and by the 80s the two provinces of Lower and Upper Germany had been created. While the Romans eventually pushed beyond the Rhine in Upper Germany, occupying parts of what is nowadays south-western Germany from the 80s and 90s onwards, the frontier zone remained largely unchanged in Lower Germany.

34 On the Antonine Wall see David J. Breeze, *The Antonine Wall* (Edinburgh: John Donald, 2006).



map 2 – frontier systems in the Germanic provinces.

Compared to Hadrian's Wall or the Antonine Wall, the frontier system in Lower Germany lacked a linear barrier. Instead, its backbone was formed by a road built probably as early as the Augustan period. The road linked the main garrisons along the Rhine with the Rhine-Maas estuary in the North and led across the Alps into Italy to the South; the river itself served as the linear barrier. The frontier system ran through three rather different landscapes. While in the southernmost bit south of Bonn the river cut through the Rhenish Massif, further to the north a large central sector offered good access across the Rhine into Germany; a large part of the forces on the frontier in Lower Germany were

stationed in this central sector between Bonn (Bonna) and Nijmegen. Beyond Nijmegen the topography changed again considerably, the landscape now being dominated by marshland.[35]

After an initial phase with two legions stationed at Vetera near Xanten and at Neuss, the frontier system was reorganized in the aftermath of the Batavian revolt of AD 69, when the legionary fortress at Vetera was destroyed. This rebuilding of the frontier resulted in the majority of the legions and the mobile elements of the province's army being stationed in the central sector, with initially four legions positioned at Bonn, Neuss, the rebuilt Vetera and newly constructed Nijmegen. In addition, of around 40 auxiliary forts in the province most were built on the line of the river at intervals of roughly ten kilometres. While the line of the frontier did not undergo significant changes throughout the 2nd century, the forts that had originally been of earth and timber construction were eventually rebuilt in stone, and the spaces between the auxiliary forts filled with smaller fortlets and watchtowers.[36]

During the early and high empire the frontier system in Lower Germany clearly showed its dual purpose of controlling access to the empire by closely surveilling movement on and across the Rhine, and of serving as an operational base for projecting power into Germany. While the last quarter of the first century still saw offensive operations such as Gaius Rutilius Gallicus' campaign against the Bructeri, by the 2nd century the frontier zone appears to have been mostly quiet, and as a result the number of legions was eventually reduced to two, one stationed at Bonn, the other at Vetera.

Whereas the development of the frontier system in Lower Germany was essentially confined to improvements and changes in a line that stayed the same throughout the early and high empire, the frontier system in Upper Germany differed considerably in that it was pushed out in several steps from the Flavian period onwards. The initial motivation for extending the boundaries of the prov-

35 The most recent general overview over the frontier zone in Lower Germany is David J. Breeze, Sonja Jilek, Erik P. Graafstal, Willem J.H. Willems and Steve Bödecker, *Frontiers of the Roman Empire: The Lower German Limes* (Leiden: Sidestone Press, 2018).

36 For an example of this rebuilding activity see the Roman auxiliary fort at Valkenburg, one of the best-known forts on the Lower German frontier; see Anne de Hingh and Wouter K. Vos, *Romeinen in Valkenburg (ZH). De opgravingsgeschiedenis en het archeologische onderzoek van Praetorium Agrippinae* (Leiden: Hazenberg, 2005), pp. 99-114.

ince appear to have been of a logistical nature: in the mid-70s a road was built connecting the two provincial capitals of Mainz (Moguntiacum, Upper Germany) and Augsburg (Augusta Vindelicum, Raetia), thereby shortening the lines of communication, which up to that point had run alongside the rivers Danube and Rhine, significantly; another road was built connecting the legionary fort at Strasbourg (Argentoratum) with the Raetian capital.

In order to protect this road network auxiliary forts were built and a frontier system was established that initially consisted of a corridor cleared through what seems to have been heavily forested areas, with a fairly small number of wooden watchtowers at suitable points allowing communication with each other. In some sections a ditch was dug as well, but this was not present everywhere in the frontier system. Around AD 120 a palisade was added in Upper Germany for unknown reasons.[37] About 25 years later the turrets were rebuilt in stone and their number greatly increased; the frontier system was now in its fully developed form, with auxiliary forts lying usually only a short distance behind a linear barrier that was controlled by a large number of watchtowers, with smaller fortlets present as well. Only about 15 years later, around AD 160, a large section of the frontier system was moved forward and new forts, fortlets, turrets as well as a palisade constructed. Instead of following the topography the frontier now ran straight for around 80km, an unusual feature among Roman frontier systems. Shortly after AD 200 the frontier system gained its final form when the palisade in Raetia was replaced by a stone wall, and a ditch 10 feet wide replaced the palisade in some places in Upper Germany.[38]

The frontier system in Upper Germany and Raetia differed considerably from that in Lower Germany in two important aspects. First, while the latter did not have a man-made linear barrier, such a barrier was an important part of the former, even if this barrier was not part of a unified structure as in the case of Hadrian's Wall or the Antonine Wall. And second, while the legionary forts in Lower Germany were located directly within the frontier zone, the Romans did not move the legions stationed at Mainz and Strasbourg forward into the Upper

37 The availability of wood has been suggested as one reason for the construction of the palisade, see David J. Breeze, Andreas Thiel, Sara Roth and Thomas Becker. *Frontiers of the Roman Empire: The Upper Germanic Limes* (Oxford: Archaeopress, 2022), p. 52.

38 For a recent overview over the Upper Germanic frontier zone's development see Breeze et al., *The Upper Germanic Limes*.

German and Raetian frontier systems. While the reasons for this decision are unknown, an important effect of it was that the Upper Germanic and Raetian frontier systems were significantly less capable of serving as an operational base for offensive operations.

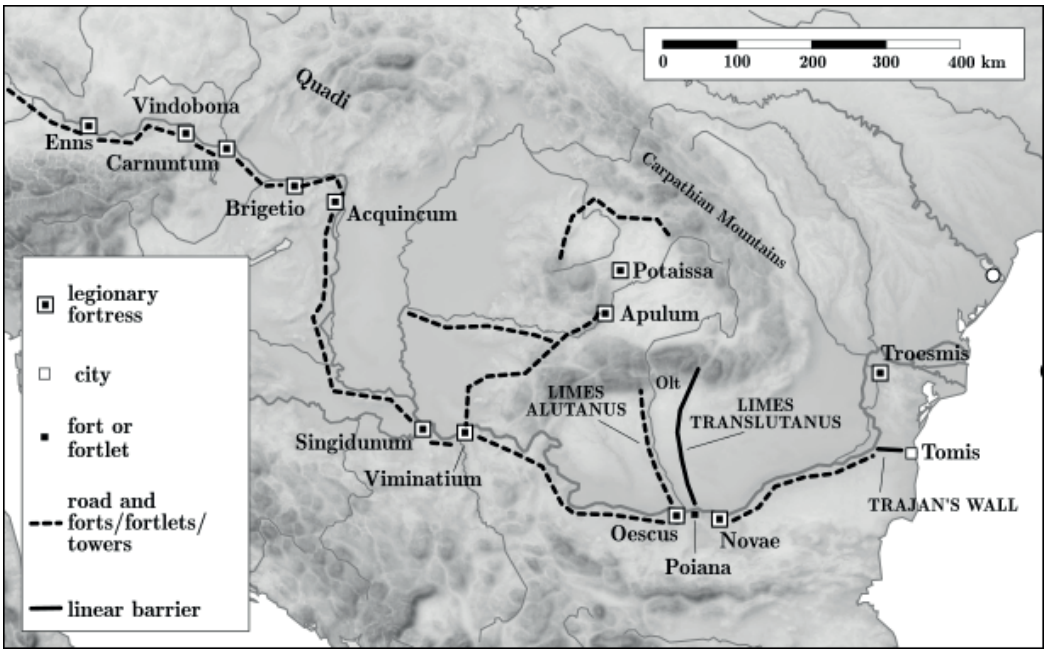
The frontier system experienced considerable pressure during the crisis of empire and was eventually abandoned after the middle of the 3rd century; a new frontier zone was established based on the rivers Rhine and Danube.

VI. The Danube frontier

For about a century, from Augustus establishing the provinces of Raetia, Noricum, Pannonia and Moesia between 29 BC and AD 10 to Trajan conquering Dacia in AD 105/106, the Danube formed the longest stretch of the Roman Empire's northern frontier; after Dacia was evacuated by Aurelian in AD 271 the Danube continued to serve as a frontier until the 5th century. The frontier systems in the provinces alongside the river were fundamentally similar to the lower Rhine frontier in that the river served both as a linear barrier and as a key line of communication; military installations on the southern bank of the river were linked to each other and connected with the hinterland by a road network that included a road running parallel to the river. Variations in the individual provinces were mainly due to the changing topography.

In Noricum, the legionary fortress at Enns (Lauriacum) formed the keystone of a system of auxiliary forts and watchtowers strung over a distance of more than 350km along a military road south of the Danube; military installations were usually located on higher ground wherever the river ran through meadows liable to flooding, and some were built to control possible crossing points. The first systematic establishment of forts of the frontier system usually called *limes Noricus* seems to have happened in the last decades of the 1st century, possibly under emperor Domitian, to be further developed under Trajan. Initially garrisons inside the province supported the frontier system, but by the time of Hadrian nearly all army units were concentrated on the frontier itself. The 2nd century saw the rebuilding of most installations in stone, but no fundamental changes in the structure of the frontier.[39]

39 See David J. Breeze, Andreas Schwarcz and René Ployer. *Frontiers of the Roman Empire:*



map 3 – The Danube frontier.

The frontier system continued in Pannonia as the *limes Pannonicus* for about 420km. Just as in Noricum the Danube itself served as both barrier and line of communication, and from about AD 45 the military road was continued along the Danube southwards, which some sections of it only completed around AD 100.[40] In Pannonia, which was divided into the two provinces of Upper and Lower Pannonia after AD 106 by emperor Trajan, eventually four legions were stationed in the fortresses at Petronell (Carnuntum), Vienna (Vindobona), Szőny (Brigetio) and Budapest (Aquincum). They formed the backbone of one of the largest concentrations of Roman army units anywhere on the frontiers of the empire. In addition to the legionary fortresses, from the time of emperor Domi-

The Danube Limes in Austria (Oxford: Archaeopress, ²2023) for the most recent overview over the frontier zone.

40 Under emperor Trajan the road was hewn into the rocks at the Iron Gates; a building inscription, the so-called *tabula Traiana* (CIL III 1699), is testimony to the skills of the Roman engineers; a Roman milestone from Engelhartszell in Austria may have preserved the name of the street, *via iuxta amnem Danuvium* (CIL III 5755).

tian onwards auxiliary forts were built in increasing numbers; today, around 50 are known, supported by around 100 smaller military installations. This large concentration suggests that for the Romans the region warranted special attention, which may be partly due to a higher level of Germanic activity on the other side of the river, where the kingdom of the Quadi, although for much of the 1st and 2nd centuries nominally a Roman client state, required frequent Roman attention.[41] As in Noricum, those elements of the frontier system infrastructure that had not already been built in stone were rebuilt during the 2nd century.[42]

The Danube frontier continued into Moesia without major structural changes running down to the Danube estuary. Four legionary bases were located at Belgrade (Singidunum), Kostolac (Viminatium), Gigen (Oescus) and Svîšov (Novae), with their associated auxiliary units again garrisoned in forts along the river. The province, which was divided into Upper and Lower Moesia around AD 86, was from the latter half of the 1st century onwards constantly involved in conflict with the kingdom of Dacia beyond the Danube. After an inconclusive war under emperor Domitian Dacia was finally conquered by emperor Trajan in two wars in AD 101–102 and AD 105–106. As a result, the empire now extended into regions well north of the Danube, which – at least in Moesia – lost its character as a frontier river. The effect on the pattern of Roman garrisons on the Danube was not as significant as one might expect. The legionary garrisons continued to be in use, and while some auxiliary units may have been moved into the newly won provinces of Dacia, some remained in their garrisons along the Danube. This slightly peculiar phenomenon is usually explained by two reasons: one, despite the conquest of Dacia the Danube was still seen as the true frontier;[43] and two, given both the river's importance as a line of communication and the nature of the road network leading up to the Danube, Roman units

41 Regular activities across the river seem to have been not that uncommon; a famous document from *cohors I Hispanorum veterana* dating to the years immediately prior to Trajan's conquest of Dacia records soldiers guarding crops on the northern bank of the river (*P.Brit.Mus.* 2851 = RMR 63).

42 On the river frontier in Roman Pannonia see David J. Breeze and Zsolt Visy. *Frontiers of the Roman Empire: The Roman Army and the Limes - The Roman Limes in Hungary* (Oxford: Archaeopress, 2022).

43 This might also lend some support to the claim in Eutr. 8.6.2, according to which emperor Hadrian initially desired to evacuate Dacia.

in garrisons along the Danube could easily move to the Rhine, via Byzantium to the East or, if necessary, into Italy. The large concentration of Roman army units in Moesia as well as in Pannonia was partly due to activities by Quadi and Dacians beyond the frontier; but both provinces were also ideally suited for allowing units stationed there to be rapidly moved to where a need arose. As in the other provinces installations originally built in earth and timber were rebuilt in stone from the early 2nd century onwards.[44]

The conquest of Dacia by emperor Trajan resulted in the establishment of three different provinces; in each province, frontier systems were built that reflected the topography of the respective frontier region.[45] Thus, in the north Transylvania was guarded by a system of forts built to block access to the Carpathian Mountains; additional forts on the other side of the mountains provided support, and the line was further strengthened by the addition of towers and fortlets as well as in some cases short linear barriers in valleys. To the southwest a chain of forts ran alongside a military road, while to the south east a chain of forts initially ran along the river Olt (ancient Alutus), as did a road running northwards from Oescus on the Danube. Under Antoninus Pius the frontier zone was pushed further eastwards beyond the river Olt; the new frontier system ran from Poiana on the Danube northwards.[46] It included a long linear barrier in form of an earthen wall 235km long, 20 forts as well as numerous smaller installations. The two legions forming the backbone of the Roman army in Dacia were stationed in Alba Iulia (Apulum) and Turda (Potaissa) behind the frontier zone.

Even further to the east a Roman road followed the course of the river to its estuary, west of which a legionary base was built at Turcoaia (Troesmis). In the years following the Roman conquest of Dacia, however, an additional frontier system was created well to the south. Associated in popular memory with the time of emperor Trajan, "Trajan's Wall" ran from Constanța (Tomis) westwards

44 For an overview over the Roman frontier zone on the Danube in Moesia see David J. Breeze and Piotr Dyczek. *Frontiers of the Roman Empire: The Lower Danube Limes in Bulgaria* (Oxford: Archaeopress, ²2024).

45 On the Roman frontier systems in Dacia see David J. Breeze and Piotr Dyczek, *Frontiers of the Roman Empire: The Roman Frontiers of Dacia* (Oxford: Archaeopress, 2021) for a recent overview.

46 The line along the river Olt is usually called *limes alutanus*, while the line established under Antoninus Pius is called *limes translutanus*.

to the Danube and was long thought to date to the early medieval period. Recent research however has shown that the frontier system had both a complex history and indeed is likely to date to the early 2nd century.[47] Around 30 forts and over 30 smaller installations along a linear barrier guarded the approaches to Thrace and the important communication lines connecting Byzantium with the Danube road.[48] Unfortunately, at present not much is known about the functional relationship of this frontier system to the military installations further north on the Danube.

The Danube frontier stands out because of the large number of troops concentrated on it. While this was in part simply due to the situation beyond the frontiers – indeed, from the time of emperor Domitian onwards the Danube frontier would demand imperial attention on a regular basis, culminating in several crises in the 3rd century, when eventually emperor Decius lost his life on a battlefield south of the Danube –, the Pannonian provinces in particular also gained considerable political importance given their proximity to Italy; the civil wars of AD 69 and AD 193 not only showed, as Tacitus succinctly noted, that emperors could be "made" outside of Rome, but also that the Danube legions always had a significant say in the matter.

VII. The Eastern Frontiers

The eastern frontiers of the Roman empire invariably conjure up images of military installations large and small in a largely desert environment, with Rome and its enemies struggling for control over access to water and caravan routes. While these images are not without an element of truth – the Roman army did indeed try to control traffic across the desert by establishing fortlets where they were sustainable – they are unlikely to be the first thing that came to the mind of a Roman soldier.

For the Roman army, the key difference between the eastern frontier and all other frontiers was the political situation beyond it: throughout the early and

47 William S. Hanson and Ioana A. Oltean, "The 'Valu lui Traian': a Roman frontier rehabilitated," *Journal of Roman Archaeology* 25 (2012), pp. 297–318.

48 This linear barrier makes "Trajan's Wall" the easternmost example throughout the Roman empire for a frontier system with an element.

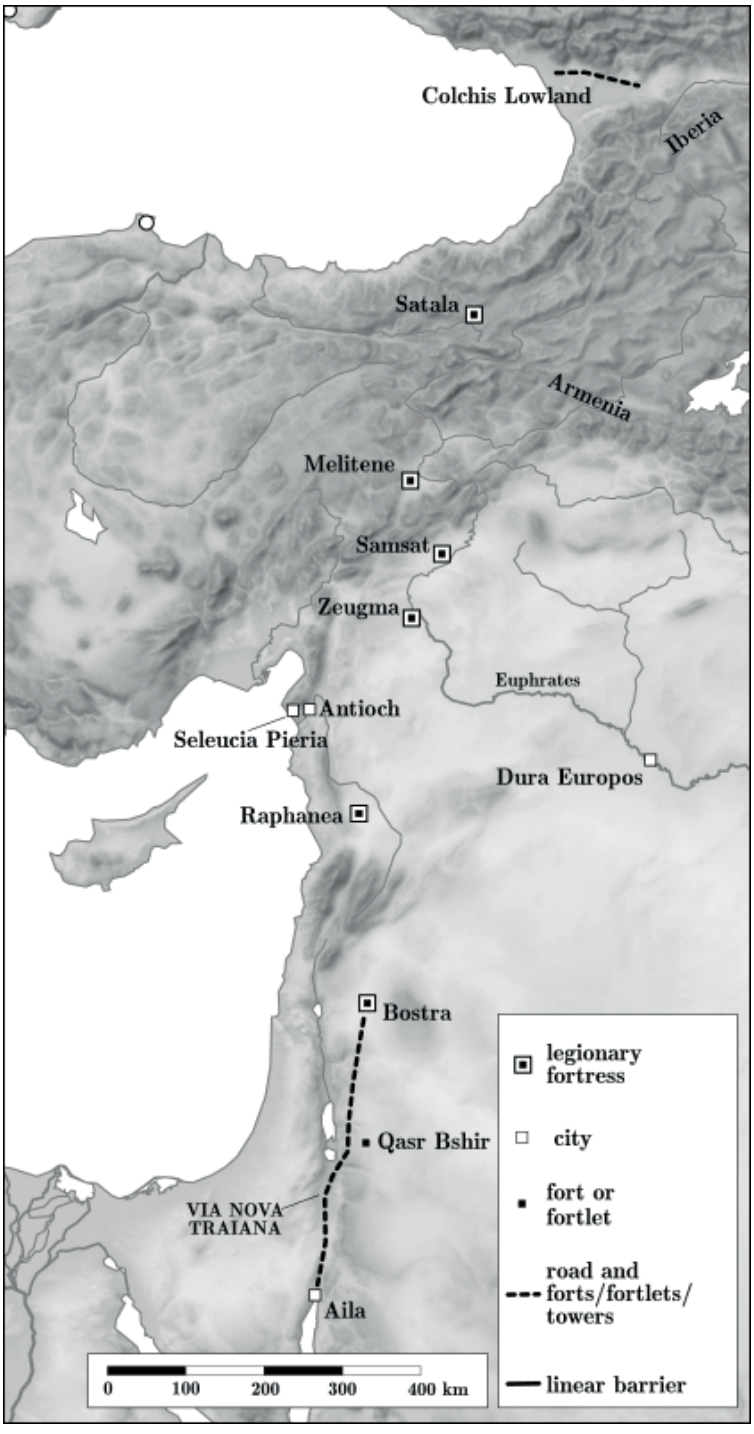
high empire the Parthian kingdom was the only political entity that could lay at least some claim to being a peer-level competitor with Rome. As a result, both constantly interacted with each other, these interactions not infrequently escalating into major warfare; in the 2nd century alone, Roman emperors personally led three major campaigns deep into Parthia, each time capturing the Parthian capital in the process.[49] These campaigns all followed the same pattern: using Antioch on the Orontes and its harbour Seleucia Pieria as the main logistics hub armies first moved northwards to the upper Euphrates before then pushing south-eastwards using the river as a key line of communication.[50] Further to the north, both Romans and Parthians fought repeatedly over the kingdom of Armenia; here, Roman military operations used the provincial road network for support. For the Romans, the northern part of the Eastern frontier, from Cappadocia down to northern Syria, was therefore crucial in the near constant conflict with the Parthian empire; the southern half extending down into Arabia, on the other hand, was of significantly less strategic importance. A Roman of the early and high principate thinking about the eastern frontier would therefore have been much more likely to think of the hills of Cappadocia or the lush Orontes valley bordering to Roman Cappadocia than of the Syrian or Arabian desert.

Unfortunately, the strategic significance of the different sections of the eastern frontier is not mirrored by modern understanding of it.[51] In Cappadocia, two legions were stationed in Satala and Melitene, each located at the end of road networks running into inner Anatolia and further west. Both legions will have been supported by a fair number of auxiliary units, but apart from a few sites between the two legionary bases little is known about their disposition, nor is a system of smaller installations at present discernible. Further to the north a series of forts guarded access to the Colchis Lowland from the north and provided a zone of contact with the kingdom of Iberia, a key Roman ally guarding important passes in the Caucasus; around AD 130 the then governor of Cappadocia,

49 For an overview see Engelbert Winter and Beate Dignas, *Rom und das Perserreich. Zwei Weltmächte zwischen Konfrontation und Koexistenz* (Berlin: Akademie-Verlag 2001), pp. 25-36.

50 See Denis van Berchem, "Le port de Séleucie Piérie et l'infrastructure logistique des guerres parthiques," *Bonner Jahrbücher* 185 (1985), pp. 47–87.

51 For a general introduction to the frontier zones in the east see David J. Breeze, Fawzi Abudanah, David Braund, Mark Driessen, Simon James, Michaela Konrad and Marinus Pola. *Frontiers of the Roman Empire: The Eastern Frontiers* (Oxford: Archaeopress 2022).



map 4 – The long frontier in the East.

Arrian of Nicomedia, wrote a topographical survey of the eastern shores of the Black Sea including an overview over the garrisons in the region, the only such description surviving from any Roman frontier.[52]

To the south of Cappadocia the province of Syria also played a key role in interacting with the Parthian empire. The importance of Antioch as a crucial logistics hub has already been mentioned; before the province was divided into Syria Coele and Syria Phoenice by emperor Septimius, it had legions stationed in bases at Samsat (Samosata), Zeugma and Raphanea. Auxiliary units are attested in the epigraphic and documentary record, but archaeological evidence from the early and high empire is scant; as elsewhere, auxiliary forts will have been positioned at key locations in the road network near the frontier, but few of them are known at present. In contrast to practices in the western parts of the empire military units could also be garrisoned within cities, the most famous example being the city of Dura Europos on the Euphrates; it came under Roman control around AD 165 and was destroyed by the Parthians in AD 256. Here, the Roman military community occupied a quarter in what was otherwise a thriving city, with converted housing blocks serving as accommodation for the soldiers.[53]

The impressive chain of fortifications, the most famous being the exceptionally well-preserved fortlet of Qaṣr Bshĩr, that nowadays stretches from Syrian down into Jordan postdates the early and high empire. The Roman province of Arabia was only established in AD 106/107 by emperor Trajan through the annexation of the former Nabataean client kingdom. A new legionary base was constructed at Bostra, and a road, the *via nova Traiana*, led from Bostra down to the Red Sea port of Aqaba (Aila). Some military installations along this new line of communications are known, but by and large the dislocation of the province's auxiliary units lies in the dark.[54]

Due to the frequency of large-scale military action – between the middle of the 1st century and the early 3rd century Rome fought four major wars against the Parthian kingdom, each causing significant changes to the line of the fron-

52 For the most recent overview over the Roman frontier zone in modern Georgia see David J. Breeze, Radosław Karasiewicz-Szczypiorski and Shota Mamuladze. *Frontiers of the Roman Empire: The Roman Frontier in Georgia* (Oxford: Archaeopress, 2024); on Arrian's *periplus Ponti Euxini* see Alain Silberman, *Arrien. Périple du Pont-Euxin* (Paris: Belles Lettres, 1995).

53 On Dura see Jennifer A. Baird, *Dura-Europos* (London: Bloomsbury 2018).

54 On the frontier zone in Roman Syria see Breeze et al., *The Eastern Frontiers*, pp. 45-61

tier – the primary function of the eastern frontier systems was to serve as an operational base for military operations. Surviving documentary evidence from shows that the provincial hinterland was an important element to Roman military logistics and administration, with Antioch serving as a key logistics and administration hub both in times of war and in peace.[55]

VIII. North Africa and Egypt

Whereas significant troop concentrations and large-scale warfare on a fairly regular scale were typical for the northern and eastern frontier systems, the situation in northern Africa was quite different. Thus, by the early 2nd century, the five African provinces extending from the Atlantic coast beyond the Straits of Gibraltar to the Suez peninsula were garrisoned by no more than three legions and their associated auxiliary units. While large and well-organized polities existed beyond the Roman frontier such as the Garamantes or the kingdom of Meroe, with a few exceptions the operational focus of Roman frontier systems was on controlling access rather than on serving as bases for offensive military operations

Farthest to the west the province of Mauretania Tingitana was in a rather peculiar situation in that it was cut off from the remainder of the empire by the Rif and Middle Atlas mountain ranges, with the High Atlas providing a barrier to the south. Governed from Tingis just outside the Strait of Gibraltar, at present it seems that access to the province was by sea, with no road connection to the neighbouring province of Mauretania Caesariensis in existence. Two major roads formed the backbone of the provincial road network, one running along the coastline to the south-west to Rabat (Sala), where the southern approaches to the town were guarded by line of fortlets and watchtowers connected by a linear barrier, the other one connecting Tingis with the inland town of Volubilis, which was ringed with five auxiliary forts. No overall system appears to have existed linking the installations on the coast near Sala with Volubilis.[56]

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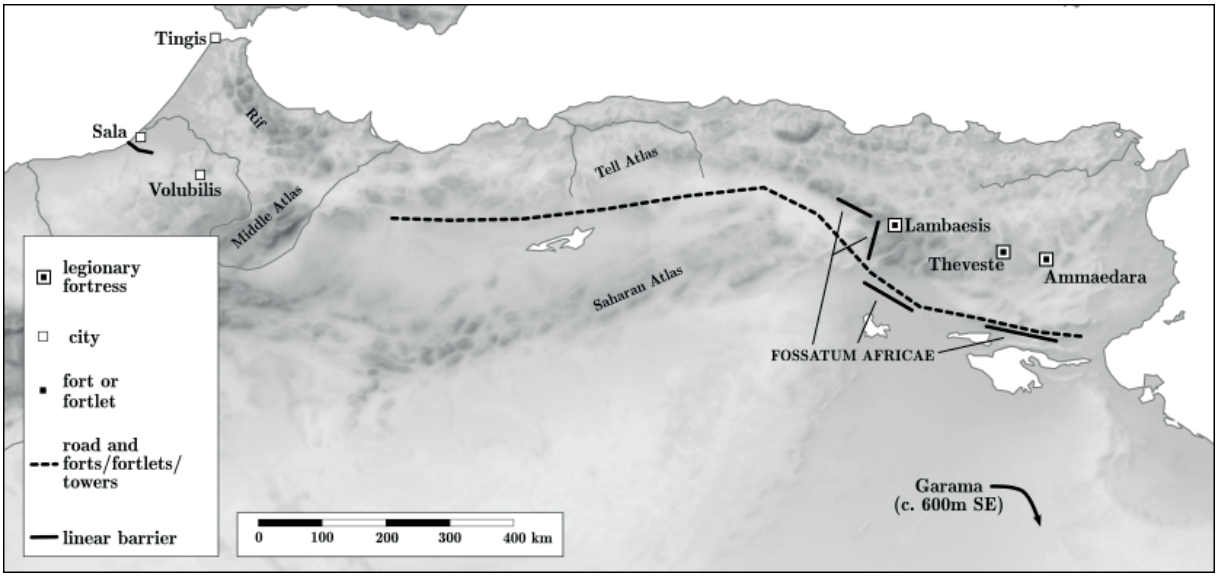
55 On Antioch's role as a centre of military logistics and administration see Jorit Wintjes, "Antioch. A Military Metropolis?" In *Antioch on the Orontes: History, Society, Ecology, and Visual Culture*, edited by Andrea DeGiorgi (Cambridge: Cambridge University Press, 2024), pp. 273-297.

56 On the Roman frontier installations in Mauretania Tingitana see Maurice Euzennat, *Le limes*



map 5 – Roman North Africa.

To the east, the province Mauretania Caesariensis shared the distinction of being a border province without a legion stationed in it. The core area of the province was the coastal area north of the Tell Atlas mountain ranges running broadly parallel to the coastline; further to the south, the Saharan Atlas formed a natural barrier to the Sahara. A Roman military road ran in between the two mountain ranges, with auxiliary forts and smaller installations strung alongside it. Probably begun in the latter half of the 1st century, most of the military infrastructure seems to have been in place by the time of emperor Hadrian. While the army would have exerted a measure of general control over the frontier area, the fairly wide spacing of forts and fortlets cannot have allowed for closely monitoring movement, suggesting that the frontier zone was rather quiet for most of the time. Around AD 200 many army units were relocated to forts alongside a newly constructed road further to the south. The exact reasons for this major undertaking are unknown; the newly established frontier system remained in place until the end of Roman rule in North Africa.

de Tingitane. La frontière méridionale (Paris: Éditions du Centre Nationale de la Recherche Scientifique, 1989).

Outside Egypt, the province of Africa Proconsularis saw the greatest concentration of units in North Africa. One of the major producers of grain in the empire, it was of key importance to supplying the city of Rome; the province was among the wealthiest in the empire, and the north-eastern part was highly Romanised. The first establishment of a frontier system goes back to the Augustan period, when the legionary base at Ammaedara was linked with both the coast and an oasis further to the south. During the 1st century the frontier system was expanded westwards into the Aures mountains, with the legion moving from Ammaedara to the newly-constructed fortress at Tébessa (Theveste). In the early 2nd century the frontier system underwent another significant change: yet another new legionary base was constructed at Lambaesis in the Aures mountains, with a chain of forts and fortlets guarding access to the provincial hinterland and individual forts pushed southwards to oases beyond the mountain ranges. A system of linear barriers, the *fossatum Africae*, which was a key feature of the frontier system in late antiquity, may have been begun under emperor Hadrian. Further east, in what would become the province of Tripolitania in late antiquity, frontier control was exerted through the establishment of auxiliary forts and smaller military installations in oases, which usually had both a permanent population and were used by nomadic tribes; several shorter stretches of linear barriers were apparently used to channel the movement of the latter. Under emperor Septimius Severus Roman forces were pushed further south, with apparently even the capital of the Garamantes deep in the Sahara under Roman control for a short time.[57]

To the east the province of Creta et Cyrenaica seems to have been the only Roman frontier province without any frontier system and with only one or two auxiliary units stationed in the province.

Egypt, finally, differed considerably from all other provinces both in its general character and its status. Best described as a personal domain of the emperor, its special position within the Roman empire is highlighted by the fact that members of the Senate were not allowed to enter Egypt unless they had obtained a personal permission to do so by the emperor.[58] Serving as one of the

57 David Mattingly, *Tripolitania* (London: Taylor & Francis, 2003), pp. 114-120.

58 Francois Jacques and John Scheid, *Rom und das Reich in der hohen Kaiserzeit 44 v. Chr. – 260 n. Chr* (Leipzig: Teubner, 1998), pp. 184-185.

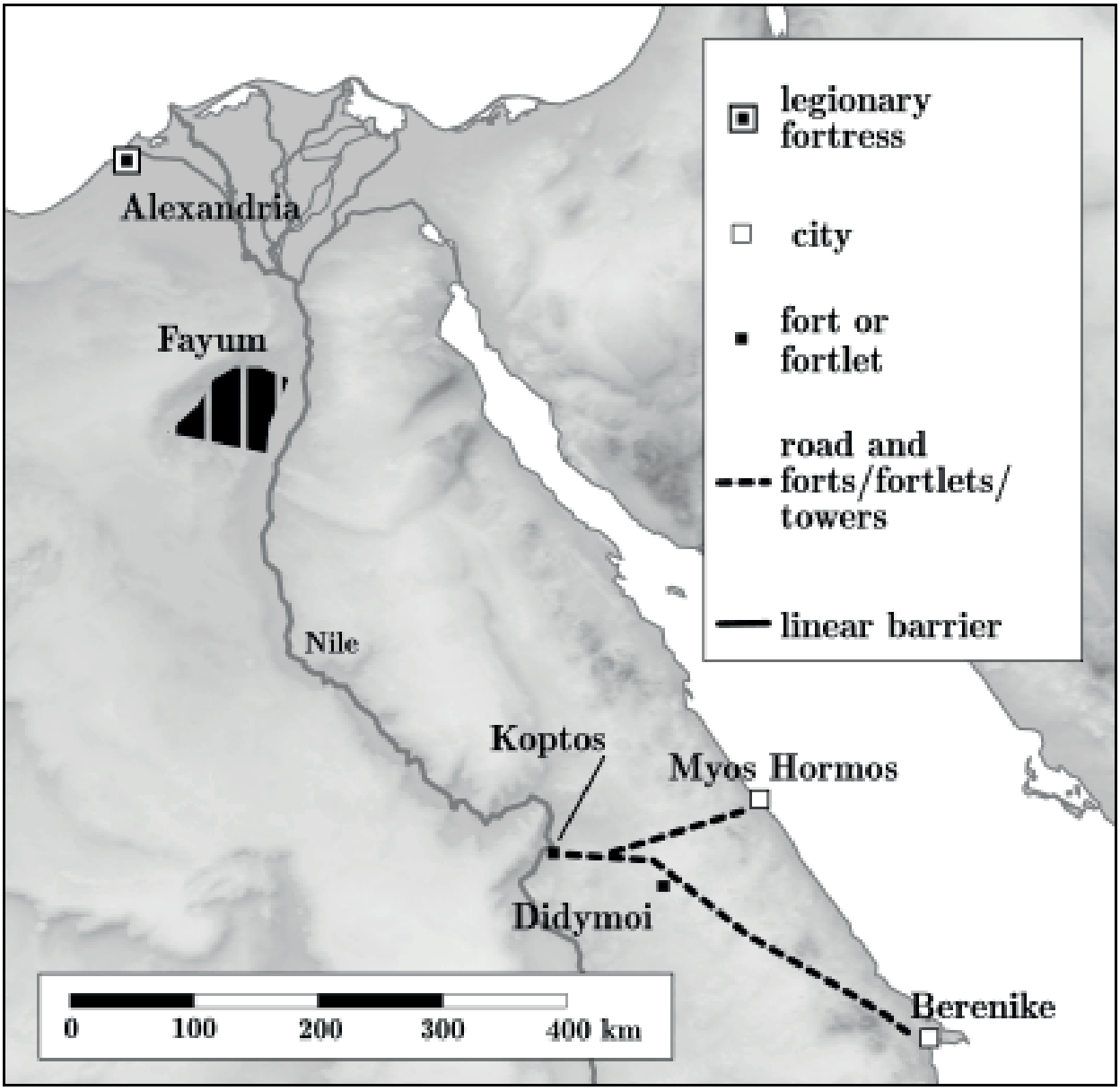
breadbaskets of the empire, the grain supplied by the province not only provided sustenance for the lower classes in the city of Rome, in doing so it also gained considerable political importance. At the same time, the topography of the province was also unique. While modern maps tend to include large swathes of the desert on both sides of the river Nile in the province of Egypt, the province proper was in fact confined to the Nile valley, the Fayum, the Nile Delta and a few oases, or to those areas where habitation was at all possible.

Originally the home of three legions, in the course of the 1st century the provincial army was first reduced to two legions and eventually in the latter half of the 2nd century to one stationed in Alexandria.[59] The legionary force in Alexandria was supported by about a dozen auxiliary units with garrisons mostly in the Nile valley. The southern frontier of the province saw some conflict with the kingdom of Meroe in the early Augustan period, but from about 20 BC onwards relations seem to have been friendly.[60] To the west no frontier system existed, with even nomadic activities at levels apparently low enough not to warrant attention from the army.

The situation in the Eastern Desert between the Nile valley and the Red Sea, however, was very different. The Red Sea ports, most notably Myos Hormos and Berenike, had already in Ptolemaeic times gained considerable importance due to the trade with India. In the early and high empire, a network of roads connected the Red Sea harbours with the Nile valley; as these roads ran through the desert small installations guarding wells were built in regular intervals along the roads. These made not only a close control of all movement on the roads possible, it also generated income collected by the army. While there are scattered references to nomads attacking travellers and even fortlets, the threat was clearly insufficient to warrant a permanent garrison at some point in the desert; instead, the military installations in the Eastern Desert were manned by detachments from units in the Nile valley. Apart from access to the Red Sea ports there

59 For the most recent overview over the frontier zones of Roman Egypt see David J. Breeze and Michel Reddé. *Frontiers of the Roman Empire: The Roman frontier in Egypt* (Oxford: Archaeopress, 2021).

60 On the southern frontier zone see László Török, "Between Egypt and Meroitic Nubia: The Southern Frontier Region." In *The Oxford Handbook of Roman Egypt* edited by Christina Riggs (Oxford: Oxford University Press, 2012), pp. 749-762.



map 6 – Roman Egypt.

were also important quarries in the Eastern Desert for which the Roman army provided protection.[61] Again the threat seems to have been low-level banditry rather than major incursions. On the whole the Eastern Desert frontier system was primarily designed to control movement and manage access to the province; documentary evidence from the system's military installations offers rare insights into the everyday level of administration and bureaucracy on a Roman frontier.

X. Conclusion

By the time news of Maximinus having elevated his son to the rank of Caesar had reached the Roman fortlet of Didymoi change was around the corner. The so-called crisis of empire would cause a significant transformation of the Roman army, resulting in the army of the 4th century looking quite different from that of the early and high principate. Frontier organization also underwent considerable changes, as is perhaps most evident in new military structures putting a much greater emphasis on defensive features as before. Less conspicuous in the archaeological record but arguably of even greater importance was the creation of high-quality mobile forces stationed behind the frontier and capable of rapid concentration against an enemy who had penetrated the frontier zone. While compared to the army of the early and high principate much less is known about the specific character and composition of these forces, it is clear that a purely static disposition of the army alongside the frontier was no longer considered to be adequate.

Yet, looking back from the reign of Maximinus to the first deployment of the Roman army on the frontiers under Augustus, one cannot fail to be impressed by the simple fact that for about a quarter of a millennium the systems of border surveillance and border control established and successively improved by the Roman army worked quite well. Indeed, in an age that seems to be captivated by the question why and when empires fail and fall, it is worth remembering that

61 Perhaps the most famous – though by far not the only – one is Mons Claudianus, where archaeological excavation has yielded a wealth of material; see Valerie A. Maxfield, "Stone Quarrying in the Eastern Desert with Particular Reference to Mons Claudianus and Mons Porphyrites." In *Economies Beyond Agriculture in the Classical World*, edited David Mattingly and John Salmon (London: Routledge, 2001), pp. 143-179.

one of the key question when it comes to the Roman Empire and its frontiers is not why the Roman system of frontier control eventually first changed and then failed, but rather how it managed to work for such a long time in the first place; for perspective, there are few elements of military organization from the days of George III still around that can lay claim to continuously functioning as originally designed.

There are two fairly obvious reasons: one, outside the two major civil wars of 69 AD (the Year of the Four Emperors) and 193 AD (the Year of the Five Emperors), which caused severe disruptions in Roman military organization and considerable losses, the early and high empire enjoyed long periods of internal stability allowing the army to focus on the frontiers. While the Roman army could experience significant setbacks during major operations, their effects were usually regional, rarely if ever affecting the whole empire.

And two, for all the setbacks the Roman army did suffer during the early and high principate, the fundamental fact remained that it still enjoyed an enormous advantage in capabilities over nearly all of its opponents. In Britain, on the Rhine and the Danube as well as in Africa, enemies might successfully stage ambushes or get the better of less-than-stellar Roman commanders once in a while. Yet as a general rule, for well over 200 years, the fastest way into a shallow grave remained challenging the Roman army on the battlefield.

As a result, on average service on the frontiers will for many soldiers probably have been rather less exciting than we imagine, and outside brief scuffles with bandits and the – very – occasional larger campaign Roman legionaries and auxiliaries were quartered quite safe even in remote locations such as Didymoi.

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Byzantine-Sasanian Struggle for Petra and the Siege Warfare in the Lazic War (541-562 AD)

by Nika Khoperia

In late antiquity, siege warfare emerged as a defining feature of military conflict along the contested frontiers of the Byzantine and Sasanian empires. These imperial borderlands—stretching across the Caucasus and Mesopotamia— witnessed persistent confrontation as fortified cities and strongholds became focal points of strategic ambition and imperial rivalry. The increasing sophistication of military engineering, combined with the logistical and political importance of controlling fortified nodes, rendered sieges both frequent and protracted. Unlike open-field battles, sieges allowed smaller, entrenched forces to resist larger invading armies, making them indispensable to the defense and expansion of imperial frontiers. Moreover, siege warfare in this period was not merely a military exercise but also a test of technological innovation, administrative coordination, and local allegiances. Nowhere was this more evident than in the Caucasian theater, where geography, shifting loyalties, and imperial ambitions converged. Within this broader context, the siege of Petra (541–551 CE) during the Lazic war between the Sasanians and the Byzantines offers a particularly illuminating case study, exemplifying the evolving tactics, political entanglements, and logistical challenges that characterized siege warfare in Late Antiquity.

Introduction

The ten-year-long struggle to capture Petra (541-551 CE) is one of the most important events of the Lazic War (541-562), a prolonged conflict between the Byzantine and the Sasanian empires - two formidable military powers of late

antiquity. In 541, Byzantine official Ioannes Tzibos built a strong and formidable fortress at a strategic position in southern Lazike, near the present-day Tsikhisdziri (Autonomous Republic of Adjara, Georgia). Petra quickly became an important economic and political center and served as a bulwark of Byzantine interests in the southern Caucasus. Emperor Justinian (527-565) used the fortress to shore up his new economic policies of trade monopoly since Petra controlled trade routes from Anatolia to the Caucasus and the western Black Sea littoral. Exasperated by Justinian's policies, the Lazic population sided with the Sassanid Persia against the Byzantines and supported the Persian invasion of Lazic in 541. According to historical sources, the Persians' immediate goal was to seize Petra, leading to a prolonged siege of the fortress. Byzantine historian Prokopios provides important details on arms and armor, army encampments, Byzantine and Sassanid siege engines, and strategy and tactics. The siege of Petra, therefore, offered an excellent opportunity to research late-ancient siege warfare. Byzantines and Persians used similar tactics, including blockading the fortress, cutting off water and food supplies, undermining the fortress walls, and launching assaults with siege ladders. The defenders used small siege engines and kettles with an incendiary liquid called "Medeia's Oil".[1] Since both the Byzantines and the Persians employed nearly all available siege methods at Petra, it should be considered one of the best examples of siege warfare in Late Antiquity.

During the period of peace following the treaty of 532 on the Eastern Front, Justinian intensified his economic policies within the empire's eastern provinces. A primary outcome of this initiative was the construction of the fortress-city of Petra in Lazike. Following the outbreak of the Lazic War in 541, Petra emerged as a pivotal strategic stronghold, the possession of which was decisive for both belligerents. Prokopios of Caesarea records that Justinian subsequently dispatched other governors to Lazike, including Ioannes Tzibos, "a man of obscure and ignoble descent who had attained high office and had been promoted to general for no reason other than that he was the most greatest villain in the world and most successful in discovering unjust sources of revenue. This man poisoned and destabilized all the relations of the Romans and the Lazoi.".[2]

1 Prokopios, *The Wars of Justinian* VIII, 11.

2 Prokopios, *The Wars of Justinian* II*, 15. Prokopios, The Wars of Justinian, Translated by Hen-*

This appointment likely occurred in 535, the same year Ioannes Tzibos laid the foundations for the fortress of Petra. Prokopios notes that Tzibos persuaded Emperor Justinian to establish this maritime city in the land of the Lazoi, where he resided as if in an acropolis, plundering the local population's wealth. Prokopios provides a detailed architectural description of the fortress. Petra's defensive superiority was fundamentally rooted in its natural topography. Positioned as an almost unreachable stronghold, its maritime defenses were complemented by a perimeter of sheer precipices—the very feature from which the city's name is derived. Access was restricted to a single, constricted passage through the lowlands, flanked by imposing cliffs.[3]

To fortify this singular point of vulnerability, the original architects extended the city walls along the rocky heights and flanked the entrance with two specialized towers. These structures deviated from standard military architecture; rather than being hollow, they were engineered with solid cores of massive, interlocking masonry. This design ensured the towers remained impervious to the structural stresses from battering rams or other heavy siege instruments.[4]

Following an archaeological study of Petra-Tsikhisdziri, archaeologist David Mindorashvili observes that there is no structural interlocking between the fortification and tower walls; instead, the tower walls abut the curtain wall. This adheres to a fundamental principle of Hellenistic and Roman fortification: maintaining structural independence between distinct buildings (in this case, the wall and the tower) so that the collapse of one structure under siege engines would not trigger the destruction of the other.[5]

Petra is also mentioned in Justinian's Novellae: the territory of Lazike was the site of Petra, a settlement that underwent a significant administrative transformation under imperial authority. By official decree, the location was elevated to the formal status of a city and rechristened Justiniana, a designation intended

ry B. Dewing, Revised and Modernized, with an Introduction and Notes, by Anthony Kaldellis (Indianapolis, 2014), 104-107.

3 Prokopios, *The Wars of Justinian* II*, 17-18.*

4 Ibid.

5 David Mindorashvili, *Archaelogical excavations at Petra-Tsikhisdziri* (Batumi, 2021), 10; Frederick E. Winter, 1971. *Greek Fortifications* (London, Toronto: Routledge and Kegan Paul, 1971), 167.

to honor and reflect the Emperor's majesty.[6]

In contemporary scholarship, particularly following the archaeological discoveries of 2017, the fortress of Petra has been definitively identified with Tsikhisdziri, located in the Adjara region of Western Georgia.[7]

As previously mentioned, Prokopios of Caesarea reports that Ioannes Tzibos transformed Petra into his personal citadel, using it as a base to "plunder the wealth of the Lazoi". While Prokopios explicitly blames Tzibos, the governor was essentially an instrument of Justinian's broader imperial policy, which introduced state monopolies over trade to maximize revenue. It is evident that Tzibos was not merely a military commander (strategos) but possessed significant civil authority, a dual role that ultimately yielded negative consequences for Byzantine influence in Lazike.

According to Simon Janashia, foreign trade was of vital importance to the ruling circles of Lazike, and they were unwilling to accept the restrictive conditions imposed by Byzantine economic control.[8] Aggrieved by the presence of Roman garrisons and the disruption of their traditional commerce, the Lazoi resolved to defect to the Sasanian side. Envoys were dispatched to Chosroes I Anushirvan, convincing the Shah that annexing Lazike offered a unique strategic opportunity: it would provide a maritime route to Constantinople and secure control over the Caucasian passes. This would allow the Persians to funnel allied tribes into Byzantine territory annually for military raids. Prokopios further notes that Chosroes received similar proposals for an anti-Byzantine alliance from the Armenians and the Ostrogothic King Vitiges.[9]

The Sasanian offensive in Lazike was further facilitated by the outbreak of the Plague of Justinian in 541. As Warren Treadgold points out, this devastating epidemic lasted four years and spread throughout the Empire, nearly claiming the life of Justinian himself. In the aftermath of his illness, Justinian marginalized

6 *The Novels of Justinian*, A Complete Annotated English Translation by David J. D. Miller, Introduction by Peter Sarris (Cambridge, 2018), 305-306.

7 David Mindorashvili, *Archaelogical excavations at Petra-Tsikhisdziri* (Batumi, 2021); Preliminary Report on the Archaeological Excavations Conducted in Petra-Tsikhisdziri in 2017 (Batumi, 2017).

8 Simon Janashia, *Shromebi* [Works], Vol. I (Tbilisi, 1949), 29.

9 Prokopios, *The Wars of Justinian II,* 2-3.

Fig. 1. The kingdom of Lazica (western Georgia) in Late Antiquity. Base map taken from Lazica.svg, sources: The Cambridge Companion to the Age of Justinian, pp. 492-493. Cambridge University Press 2006; Greatrex, Geoffrey; Lieu, Samuel N. C.. The Roman Eastern Frontier and the Persian Wars (Part II, 363–630 AD). Routledge 2002, pp. xxx-xxxii

his top general, Belisarius, accusing him of conspiring to seize the throne upon the Emperor's death. The plague decimated both the military and the tax-paying civilian population, precipitating a financial crisis that forced the Empire to curtail military expenditures, including soldiers' pay. This domestic instability had immediate repercussions on the frontiers; in Italy, Ostrogoths successfully reclaimed territory as Byzantine units suffered from desertion and mutiny.[10] The Persian Shah accepted the terms of the Lazic envoys, who promised to guide his

10 Warren T. Treadgold, *Byzantium and its army, 284-1081* (Stanford, 1998), 16.

army through the difficult, densely forested terrain of Lazike. The Persian forces cleared paths through the thick, steep woods to make the country accessible to the army. Upon reaching "Central Colchis," King Goubazes II paid homage to Chosroes, the son of Kavad, surrendering his royal authority and the entirety of Lazike to him.[11] A point of historical inquiry remains: why did Tzibos fail to secure the mountain passes from Iberia when the Persian army began its advance? If Tzibos possessed intelligence regarding the invasion, he may have chosen to concentrate his limited forces within Petra rather than risk dispersing them across multiple mountain routes. Historian John Bury notes that Chosroes successfully masked his true intentions by spreading rumors that he was traveling to Iberia.[12] Consequently, the Byzantines remained unprepared, unaware of the Lazi's betrayal, which allowed the Persian army to enter Lazike secretly and safely. Nevertheless, from a military standpoint, the failure to station defenders at the strategic passes while the enemy occupied neighboring Iberia constitutes a significant oversight by the Byzantine command.

First Siege of Petra

According to Prokopios of Caesarea, Tzibos received intelligence that Chosroes had appointed Aniabedes as commander over the army and directed him toward Petra. In response, Tzibos concentrated his entire military force within the fortress of Petra. The failure of the initial Persian assault was a direct result of Tzibos's military stratagem. It appears that Tzibos was not an unskilled or inexperienced commander; rather, he was capable of successfully employing a variety of tactical maneuvers. According to Prokopios, Tzibos armed his entire garrison, positioned them near the city gates, and commanded absolute silence. When the Persians approached the fortifications and saw or heard no sign of the enemy, they concluded that the defenders had abandoned the city. Consequently, they moved even closer to the walls to plant scaling ladders, believing the battlements were undefended. Because they remained unaware of any enemy presence, they sent word to Chosroes to inform him of the situation. Chosroes then dispatched a large portion of the army and ordered an assault on the walls from

11 Prokopios, *The Wars of Justinian II,* 17.

12 John Bury, *History of the Later Roman Empire: from the death of Theodosius I to the death of Justinian*, volume II (New York, 2011), 101.

all sides, specifically commanding that the gates be breached with a battering ram. On Tzibos's command, the Byzantines suddenly threw open the gates and launched a surprise sortie, annihilating a portion of the enemy forces, particularly those stationed at the battering ram. The remaining Persians barely managed to escape back to their commander. According to one account, Chosroes executed Aniabedes (or, according to another tradition, the commander of the ram crew) for allowing himself to be deceived by a man he regarded as a mere "huckster" and a non-combatant, Ioannes Tzibos.[13]

Such military tactics were well known in the ancient world, as evidenced by historical sources. In the *Strategemata* by the ancient author Sextus Julius Frontinus (1st–2nd centuries AD), an entire chapter is dedicated to organizing surprise attacks from fortresses against besiegers. For example, during the defense of Panormus, when Hasdrubal laid siege, the Romans intentionally posted only a small number of guards on the walls. When Hasdrubal, emboldened by their apparent numerical weakness, approached the walls, the Romans surged out and destroyed his forces. Similarly, the citizens of Asculum, facing a storm by Pompey, placed the elderly and the sick on the walls to project vulnerability. This led the Romans to lower their guard, at which point the defenders charged out and forced the enemy to retreat.[14] A slightly different situation occurred during the war between the Numantines and the Romans: the besieged Numantines did not take up battle positions at the walls. They remained hidden for so long that Popilius Laenas decided to launch an assault with ladders. Suspecting an ambush because the enemy offered no resistance on the walls, he recalled his men; however, the Numantines suddenly rushed out and attacked the Romans from the rear.[15]

These examples demonstrate that Tzibos employed a proven method well known in antiquity, and the maneuver at Petra stands as a classic example. Although Prokopios does not consider Tzibos an expert in military affairs or a seasoned commander, in this specific episode, Tzibos planned and executed the military maneuver with great success. The Byzantines experienced similar suc-

13 Prokopios, *The Wars of Justinian II,* 17.

14 Sextus Julius Frontinus, *The Stratagems and The Aqueducts of Rome*, With English Translation by Charles E. Bennett (London, 1925), 257-258; 261.

15 Ibid, 261-262.

cess against the Persians during the siege of Archaeopolis in 551. Occasionally, when besiegers anticipated a sortie or wished to lure the enemy out themselves, they would set an ambush and inflict heavy losses.[16] According to Frontinus, the Roman commander Cato acted in this manner against the besieged Lacetani in 193 BC, as did the Carthaginian Hamilcon against Agrigentum in 406 BC.[17]

Following the initial failure, Chosroes initiated a full encirclement of Petra. He surveyed the city walls and noted they were not particularly robust; consequently, he launched a storm and ordered his archers to rain arrows upon the battlements. While the Persians inflicted minimal damage on the Romans sheltered behind the walls, they themselves suffered significantly, as Tzibos's warriors fired upon them from above using artillery and bows.[18] It is a matter of historical interest exactly what type and quantity of siege engines the garrison at Petra possessed, and what sort of platforms were used for their operation. According to Titus Livius, the number of artillery pieces in besieged cities could be quite high; for instance, when Scipio captured New Carthage in 209 BC, he found 120 large and 281 small catapults, 23 large and 52 small ballistae, and numerous large and small "scorpions". While these figures may be exaggerated, they provide a basis for arguing that not only besiegers but also defenders of well-fortified cities utilized numerous siege engines. Relying on ancient sources and archaeological data, Historian Konstantin Nosov notes that wall defenders primarily used 10-caliber (4.4 kg) stone-throwing machines.[19] Presumably, such machines (small catapults) were present in Petra, though in much smaller numbers than in New Carthage, which was a large city requiring a larger garrison and more artillery to defend against a numerically superior foe. It should be noted that the question of siege engines at Petra is considered primarily from the perspective of antiquity rather than the Middle Ages. This is because no significant changes in siegecraft occurred in Europe and the Near East until approximately the second half of the 11th century; in many cases, early medieval operations were even more primitive than Roman operations. Furthermore, the traction trebuchet, which allowed for the more powerful throwing of heavy stones, had not yet appeared.

16 Prokopios, *The Wars of Justinian VIII*, 14.

17 Frontinus, *The Stratagems and The Aqueducts of Rome*, 237.

18 Prokopios, *The Wars of Justinian II*, 17.

19 Konstantin Nosov, *Ancient and Medieval Siege Weapon* (Guilford, 2005), 154.

During the Persian assault, Tzibos was killed after being struck in the neck by an arrow. The loss of the commander would have undermined the garrison's morale, and Petra likely could not have withstood the Persian siege for long. Despite its strong natural defenses and fortifications, the city could not survive a permanent blockade and total isolation from reinforcements. The Persians began digging a mine under a tower, and upon reaching the foundation, they inserted timber and set it on fire, causing the tower to collapse shortly thereafter. However, the Byzantines sensed the danger in advance and abandoned the tower. Ultimately, they received a guarantee from Chosroes that they could freely leave the city with their property. This was carried out, and they eventually merged with the Persian army. Petra fell into Persian hands, and Chosroes seized Tzibos's wealth.[20]

The first siege of Petra demonstrated that the Sasanians were well-acquainted with various siege methods and employed them successfully. Among their operations against the Romans, the siege of Dura-Europos in 256 is particularly famous. There, the Persians dug a mine under the fortress, while the Romans dug a counter-mine from the inside. It is theorized that during the confrontation within these tunnels, the first recorded instance of chemical weapon use by the Persians occurred.[21] While Eurocentric historians often claim that the Sasanians learned siegecraft from the Romans, it is clear that the Sasanians' neighbors from Transoxiana—through close contact with China—were more advanced in siege warfare than European military engineers.[22] Traditional Sasanian siege methods included encircling enemy strongholds with trenches and large wicker shields, and assaulting walls via mining, battering rams, wooden siege towers, and stone-throwing ballistae.[23] Prokopios himself acknowledges that the Sasa-

20 Prokopios, *The Wars of Justinian II*, 18.

21 Duncan Campbell, "Death in the dark at Dura-Europos: Did the Sassanids use chemical warfare?" in *Ancient Warfare*, Volume IV, issue 1 (2010), 46-51.

22 The military customs of the Romans and the Persians were becoming increasingly similar, so much so that the armies of Justinian and Khosrow did not differ significantly from one another. Alireza Shapur Shahbazi, "ARMY i. Pre-Islamic Iran." *Encyclopedia Iranica*. Vol. II, Fasc. 5. December 15, 1986. 489-499. The traction trebuchet, one of the most popular stone-throwing machines, first appeared in the Far East, moved to the Middle East, and from there, its use was adopted by others. Paul E. Chevedden, „The Invention of the Counterweight Trebuchet: A Study in Cultural Diffusion", *Dumbarton Oaks Papers*, 54 (2000), 71-116.

23 David Nicolle, *Sasanian Armies: the Iranian Empire, Early 3rd to Mid-7th Centuries AD* (Stockport, 1996), 47. The primary difference between the Parthian and Sasanian armies was

nians were as skilled as the Byzantines in siegecraft, noting that both states possessed many masters of the craft who frequently employed machines against fortifications in harsh, inaccessible terrain.[24]

Mining was a complex engineering operation that could only be carried out by trained specialists (sappers).[25] The length of a tunnel required for mining sometimes reached two to three hundred meters, necessitating specialized safety technology to prevent collapse. The rapid execution of the mine by the Persians at Petra indicates the presence of experienced engineering units within Chosroes's army.

Mining was one of the most accepted methods of siege warfare in Late Antiquity and is frequently mentioned in contemporary sources and military treatises. Digging a tunnel under a fortress foundation was considered a highly effective method in the ancient world. For instance, when Philip V of Macedon could not take the stronghold of Prinasus by any other means, he ordered his men to begin digging in front of the wall to simulate the construction of a mine. The guards, believing their foundation had been undermined, surrendered.[26] After excavating the foundation, it was common to bring fuel into the tunnel and set it on fire to collapse the wall. According to the famous 2nd-century Greek engineer Apollodorus of Damascus, if a wall is made of stone, a common technique is to light a fire around it to break and loosen the stones.[27] For a mine, a secret tunnel would be dug from a distant point to reach the wall foundations. Once the foundation masonry was dismantled and replaced with flammable supports, the resulting void was ignited. The fire at the base of the wall would decompose the mortar binding the stones, causing the masonry to disintegrate and the wall to collapse. Naturally, while it was impossible to mine fortresses situated on solid rock, the location of most cities almost always made mining a viable option.

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the Sasanians' exceptional proficiency in siege warfare. Adrian Goldsworthy, *Roman Warfare* (London, 2000), 187-190.

24 Prokopios, *The Wars of Justinian VIII*, 11.

25 The Sasanian army included engineers who were well-versed in the construction of siege engines. The Persians were aware of and prepared for the losses they would incur during the siege of strong fortifications. Goldsworthy, *Roman Warfare*, 187-190.

26 Frontinus, *The Stratagems and The Aqueducts of Rome*, 229.

27 Apollodorus of Damascus, "Poliorketika" [Poliorcetica] In *Grecheskie poliorketiki; Flavii Vegetsii Renat* [Ancient Greek Siege Warfare; Flavius Vegetius Renatus], 25–90 (St. Petersburg,1996), 38.

Second siege of Petra

Following the capture of Petra, Chosroes Anushirvan received intelligence that Justinian's celebrated commander, Flavius Belisarius, had invaded Mesopotamia, launched an assault on Nisibis, and captured the fortress of Sisauranon.[28] According to Byzantine sources, Belisarius was unaware of the events unfolding in Lazike, having received only false information intentionally circulated by Chosroes, suggesting that the Shah had departed for a campaign against the Huns.[29] Consequently, Chosroes was compelled to abandon Lazike and rapidly redeploy his forces toward Mesopotamia. Prokopios of Caesarea notes that the Lazoi found the Persian yoke far more burdensome than the Byzantine one. This sentiment was exacerbated by reports that Chosroes, after securing a foothold in Lazike, plotted to assassinate King Goubazes II to facilitate future campaigns against Byzantium.[30] This threat appears credible, as evidenced by the Lazis' decision to return to the Byzantine side and confront the Persians.

According to Prokopios, the Shah's ultimate goal was to construct a fleet on the Black Sea, for which he dispatched a vast quantity of timber to Lazike. He concealed this objective by claiming the timber was intended for the "construction of machines on the walls of Petra". Ultimately, a lightning strike ignited the timber, incinerating the entire supply.[31] This detail is significant because it demonstrates that the Persians, like the Byzantines, used small stone and bolt-throwing engines stationed within the fortress. Furthermore, it would later be revealed that they employed incendiary pots during the defense of the city.[32] Empowered by the renewed alliance with King Goubazes, Emperor Justinian dispatched an army of 8,000 men to Lazike under the command of Dagisthaios. Joining forces with the king Goubazes, they immediately marched to besiege Petra, which remained a vital strategic node that the Byzantines could not afford

28 In the spring of 541, Belisarius returned from Italy to Constantinople and prepared for war against the Persians. Together with him, Justinian dispatched other commanders, recalled from Italy, and even Goths, except for their king, Vitiges, who remained in Constantinople. Prokopios, *The Wars of Justinian* II, 19.

29 Prokopios, *The Wars of Justinian* II, 16.

30 Prokopios, *The Wars of Justinian* II, 29.

31 Ibid.

32 Prokopios, *The Wars of Justinian* VIII, 11.

to leave in their rear.[33]

Upon hearing of the siege, the Persians resolved to provide rapid relief to the garrison, which Prokopios estimated at 1,500 warriors. Given the scale of fortresses on the eastern Black Sea coast, this figure may be exaggerated, though the fortress undoubtedly maintained a strong garrison proportionate to its size. Dagisthaios ignored Goubazes' advice to adequately secure the mountain passes leading from Iberia into Lazike—an oversight that would prove costly.[34]

According to Prokopios, the garrison at Petra became severely weakened during the siege, suffering heavy losses and falling into despair.[35] The narrative suggests that before attempting mining (tunneling beneath the foundations), the Byzantines and Lazoi conducted several unsuccessful sieges of the city. While these failed to capture Petra, they further depleted the already small garrison. Military theory suggests that "maximum defensive effectiveness is achieved when each warrior covers approximately 1.3 meters of the defensive perimeter". Thus, a fortification with a circumference of 1,000 meters would require roughly 769 soldiers for full coverage, or approximately 1,000 including necessary reserves.[36] By this stage, the garrison at Petra likely had only half its strength remaining. It is unknown whether epidemics broke out within the fortress or if supplies remained sufficient; such crises were common during protracted sieges for both the besieged and the besiegers.

To capture Petra, Dagisthaios turned to mining, a tactic frequently and successfully employed by the Byzantines. The prominent 10th-11th-century Byzantine commander Nikephoros Ouranos wrote in his military treatise: "The most effective method, which the opponent cannot overcome, is the undermining of the walls."[37] The first Byzantine mining attempt at Petra was successful. They

33 Prokopios, *The Wars of Justinian* II, 29.

34 Bury, *History of the Later Roman Empire*, 114.

35 Prokopios, *The Wars of Justinian* II, 29.

36 Soso Margishvili, *Shua saukuneebis samkhedro khelovneba da sakartvelos samkhedro-politikuri istoria IX-XV saukuneebshi* [Medieval Military Art and the Military-Political History of Georgia in the 9th-15th Centuries] (Tbilisi, 2012), 259.

37 Until the 12th century, the Byzantines most frequently utilized subterranean mining to capture fortifications. Mamuka Tsurtsumia, *Sakartvelos samkhedro istoriis sakitkhebi* [Issues in the Military History of Georgia]. Vol. 1. (Tbilisi, 2013), 222. The siege and ultimate capture of Petra (near Batumi, Georgia) by the Byzantines demonstrated their proficiency in both masonry construction and siege mining. Peter Purton, *Early Medieval Siege* (Woodbridge, 2009), 25.

Fig. 2. Ruins of the Petra fortress and the Church of St. John the Baptist, Adjara, Georgia, 2014. Phoyo by Mikhel. CC SA 4.0 Wikimedia Commons.

excavated beneath the foundation and collapsed a section of the fortification wall. However, the Persians were saved by a house situated directly behind the wall, which "served the besieged as a substitute wall and protected them no less effectively".[38]

Recognizing that the fortifications could be undermined, Dagisthaios became so confident of his eventual victory that he sent a premature report to Emperor Justinian, claiming that Petra would soon fall. After several more failed assaults further thinned the garrison, the Byzantines resumed mining. They progressed to the point where the foundation "no longer rested on the ground but hung largely in empty space," and would have collapsed immediately had Dagisthaios set fire to the supports. However, expecting a reward from the Emperor, he delayed the operation, wasting critical time.[39]

The Persians likely did not know exactly where the Byzantines were mining, though various detection methods existed. One such method involved placing water-filled vessels on the wall; vibrations from underground strikes would

38 Prokopios, *The Wars of Justinian* II, 29.

39 Prokopios, *The Wars of Justinian* II, 29-30.

cause ripples in the water, allowing the defenders to determine the tunnel's direction and begin a counter-mine.[40] The 4th-century BC Greek author Aeneas Tacticus advised that when an enemy undermines a fortress, the defenders should dig a deeper trench from the inside to expose the enemy miners. If possible, a wall of heavy stones should be built in the trench, or it should be filled with wood and brushwood. Once the enemy tunnel broke into the trench, the wood was ignited, likely killing the miners through suffocating smoke. There are even accounts of releasing wasps and bees into the tunnels. Prokopios, however, does not mention whether the Persians utilized these specific methods.[41] During this period, the Persian commander Mermeroes was racing to rescue the Petra garrison. At a high cost of life, he managed to overcome the small detachment Dagisthaios had stationed at the Iberia-Lazike passes and moved quickly toward the besieged city. A small Byzantine force under the Armenian Ioannes Gouzes managed to enter Petra through a section of the wall that had collapsed, but the garrison repelled their attack. Hoping for relief, the Persian garrison commander Mirran (Mihran) initiated negotiations with Dagisthaios regarding surrender, though this was merely a stalling tactic. Soon, Mermeroes' army arrived, forcing Dagisthaios to retreat.[42]

An attempt by the Persians to plunder the retreating Byzantine camp was repelled by the Tzani tribesmen in Dagisthaios' army, who drove off the Persians and plundered the camp themselves. The condition of the garrison after this protracted siege was dire. Of the original 1,500 warriors, only 500 remained, 350 of whom were wounded and "unfit for war".[43] Their sacrificial struggle reportedly impressed Prokopios. The Persians did not discard their dead outside the fortress to prevent the enemy from "gaining courage from seeing their losses".[44] Although epidemics often emerged in such conditions, none were reported here.

40 Margishvili, *Shua saukuneebis samkhedro khelovneba da sakartvelos samkhedro-politikuri istoria*, 262.

41 Aeneas Tacticus XXXVII, 3-9. *Aeneas Tacticus, Asclepiodotus, and Onasander*, Loeb Classical Library №156 (Cambridge, 1923), 186-187.

42 From the account of Prokopios, it is clear that had Dagisthaios stationed even a few hundred men at these passes—as Gubazes had advised—the Persians would have been unable to cross, and the Byzantines would have captured Petra much sooner. Prokopios, *The Wars of Justinian* II, 30.

43 Prokopios, *The Wars of Justinian* II, 30.

44 Ibid.

The garrison had every reason for such desperation: if an enemy breached a fortress, they typically treated the defenders and their property as they wished, often resulting in mass slaughter, enslavement, and plunder.[45] Despite the siege's length, there is no record of food or water shortages. According to the Byzantine military treatise *De obsidione toleranda*, a commander facing a siege should stockpile six months to a year's worth of provisions and fill reservoirs with water. The fortress should also be equipped with armorers, engineers, doctors, and craftsmen.[46] The Persians evidently possessed sufficient stores to endure the siege, as was later confirmed at the end of the third siege of Petra. Simultaneously, King Goubazes defended the far bank of the Phasis River, building fortifications to prevent a Persian crossing. Emperor Justinian had provided funds to the Sabir Huns to aid the Byzantines in Lazike, while military units under Recithanc the Thracian were also hurrying to assist Dagisthaios.[47] Ultimately, the Persians were forced to leave Lazike, leaving a 5,000-man detachment to support and supply Petra. This unit was destroyed by Goubazes and Dagisthaios, who then stationed Lazic garrisons in the narrow passes to prevent further Persian relief.[48] In the spring of 550, they achieved a major victory over another Persian force sent by Mermeroes at the Tskhenistskali River. Shortly thereafter, Dagisthaios[49] was recalled and imprisoned, and he was replaced by the commander Bessas.[50]

45 Antonio Santosuosso, *Barbarians, Marauders and Infidels: The Ways of Medieval Warfare* (Boulder, 2004), 210-211.

46 Tsurtsumia, *Sakartvelos samkhedro istoriis sakitkhebi*, 232. "A Byzantine Instructional Manual on Siege Defense: The De Obsidione Toleranda," introduction, English translation and annotations by Denis F. Sullivan, in *Byzantine Authors: Literary Activities and Preoccupations*. Texts and Translations Dedicated to the Memory of Nicolas Oikonomides, ed. By John W. Nesbitt (Leiden, 2003), 140, 144.

47 Prokopios, *The Wars of Justinian* II, 30.

48 Ibid.

49 From 551, Dagisthaeus fought in Italy against the Gothic King Totila in the army of Narses, the eunuch who was one of Justinian's finest generals. He also participated in the Battle of Taginae (Busta Gallorum) in 552. Under the commander's orders, he was the one who recaptured Rome, leading Procopius of Caesarea to remark that while Bessas lost Rome (failing to defend it from Totila in 546), but took Petra—an opportunity Dagisthaeus had squandered—Dagisthaeus, in turn, captured Rome, which Bessas had previously lost. Prokopios, *The Wars of Justinian* VIII, 34.

50 Bessas – A commander likely of Gothic origin. During the initial stage of the Lazic War, he was the most experienced among the Byzantine leaders. Throughout his career, Bessas fought against the Persians in Mesopotamia, against the Goths in Italy under the command of Belisarius, and finally, once again against the Persians in Lazike. John Martindale, *The Prosopog-*

Third Siege of Petra

Bessas arrived in Lazike and assumed command of the forces and the siege of the fortress-city of Petra. Accompanying him was Venilos, the brother of Bouzes, who had been dispatched with his own troops before Bessas' arrival, alongside Odonachos, Babas the Thracian, and Uligag, a commander of Herulian origin.[51] Beyond the siege of Petra, Bessas was tasked with stabilizing the situation in Abasgia, where the rulers, Opsites and Skeparnas, had revolted and defected to the Persian side. Justinian was compelled to order Bessas to dispatch a portion of his army to Abasgia. Consequently, Bessas placed Uligag the Herulian and Ioannes, son of Thomas, in command of a significant detachment and sent them to Abasgia by sea. They successfully defeated the Abasgians, forcing King Opsites to flee to the Huns (Sabirs).[52]

Under Bessas's command, the Byzantines resumed work on the tunnels that had been initiated during the tenure of Dagisthaios. Following Dagisthaios' departure from Petra, the Persians hastily reinforced the foundations excavated by the Byzantines with sandbags and wooden pillars. When the Byzantine miners reached this area, the wall's foundation gave way, but the miners quickly filled the void. Although this reduced the wall's height, it made it more difficult for the Byzantines to approach with siege engines.[53] The solution to this predicament was found by the Byzantine allies, the Sabir Huns, who, according to Prokopios of Caesarea, invented a new type of krios (battering ram) to demolish the walls.[54]

The battering ram (Gr. Krios; Lat. Aries) had been the most popular siege weapon since antiquity. It consisted of a massive beam, one end of which was clad in bronze or iron (often forged in the shape of a ram's head, hence the name). The ram was swung manually to strike walls or gates. While Vitruvius attributed the invention of such siege engines to the Carthaginians, they were undoubtedly employed in poliorcetis much earlier.[55] Constructing a ram did not

raphy of the later Roman Empire, vol. III (Cambridge, 1992), 226-229.

51 Prokopios, *The Wars of Justinian* VIII, 9.

52 Prokopios, *The Wars of Justinian* VIII, 9-10.

53 Prokopios, *The Wars of Justinian* VIII, 11.

54 Prokopios, *The Wars of Justinian* VIII, 11. Purton, *Early Medieval Siege*, 25.

55 Konstantin Nosov, *Osadnaya tekhnika: Antichnost' i Srednevekov'ye* [Siege Warfare: Antiquity and the Middle Ages] (Moskva, 2010), 87.

Fig. 3. Fig. 2 Giorgi Abdaladze, Ruins of the walls of the Petra Fortress in Tsikhisdziri, Adjara,17 June 2020, 11:37:33 Communications Department of the Administration of the President of Georgia. CC SA 4.0 International. Wikimedia Commons.

require specialized knowledge, but protecting the soldiers operating it was a significant challenge. Furthermore, the composition of the target wall was crucial. According to Apollodorus, a brick wall is harder to demolish with a ram than a stone one; brick is softer and more yielding, absorbing the force of the blow, whereas stone is more rigid and offers greater resistance, causing the strike to retain its full force and shatter the stone.[56] Occasionally, instead of a ram, besiegers sheltered under wooden sheds, used drills, or dismantled walls using crowbars and pickaxes.[57]

The primary innovation of the ram developed by the Sabirs during the siege of Petra was the use of lightweight branches instead of heavy planks and beams for the frame, with the only solid beam being the ram itself. Typically, such a

56 Apollodorus of Damascus, "Poliorketika" [Poliorcetica], 41.

57 Tsurtsumia, *Sakartvelos samkhedro istoriis sakitkhebi* [Issues in the Military History of Georgia], 219.

"tortoise" (testudo) was covered with hides. Consequently, the machine was much lighter and did not require wheels. The forty men it could shelter could easily transport it on their shoulders. Years later, the Sabirs constructed a similar ram during the assault on Archaeopolis.[58] That fortress was situated on a cliff, where conventional rams could not reach its fortifications.[59]

The Byzantines deployed the ram against the wall, accompanied by well-armored warriors equipped with hooked spears to pull down stones loosened by the engine. As noted, stone walls were more vulnerable to this machine than brick ones. The stone walls of Petra began to succumb to the blows, and the Byzantines might have breached the fortress had it not been for a pre-planned Persian tactic.

According to Prokopios, the Persians placed a wooden tower on the ramparts they had prepared in advance and filled it with elite, heavily armored warriors.[60] They filled pots with sulfur, asphalt, and a substance the Medes called naphtha, and the Greeks called "Medeia's Oil".[61] They ignited these pots and hurled them at the siege engines. Despite the attackers' efforts to protect the ram, it caught fire and was destroyed[62], rendering the attempt to demolish the wall unsuccessful.

The term naphtha is of Oriental origin, and its use was not novel to the Persians. Naphtha had been used as a light source since antiquity, with Herodotus describing its use among the Persians. The modern Persian naft and Greek naphtha likely derive from the Akkadian naptu, meaning "mountain oil" in Sumerian, distinguishing it from vegetable or fish oils.[63] As Gela Gamkrelidze notes,

58 This time, by order of the Persian commander Mihr-Mihroe. However, during the siege of Archaeopolis, a direct assault on the city walls effectively did not occur, and the fate of the battle was decided outside the fortifications. Therefore, for the study of siege warfare in the Lazic War, we have preferred to focus on the siege of Petra, which is far more diverse in this regard and represents a classic example of a siege. Prokopios, *The Wars of Justinian* VIII, 14.

59 Prokopios, *The Wars of Justinian* VIII, 14. Nosov, *Osadnaya tekhnika: Antichnost' i Srednevekov'ye* [Siege Warfare: Antiquity and the Middle Ages], 92.

60 Prokopios, *The Wars of Justinian* VIII, 11.

61 The same observation ("the Greeks also call it Medea's oil, while the Persians call it naphtha") is noted in the Suda, a 10th-century Greek-language Byzantine encyclopedia. https://www.cs.uky.edu/~raphael/sol/sol-html/ [Suda online. Keyword: Medea/Medeia]; https://sententiaeantiquae.com/2016/04/06/stuff-the-suda-says-medeas-oil/

62 Prokopios, *The Wars of Justinian* VIII, 11.

63 Willem M. Floor, "Lighting Equipment and Heating Fuel." Encyclopedia Iranica. Published

"Medea's Oil" was used in Colchis during the Lazic War as a form of proto-napalm. Classical sources confirm the presence of naphtha in "Medea's Oil," and Colchis was a region where the properties of petroleum were well known.[64] The exact composition of the incendiary material used to burn enemy engines remains unknown, much like the "Greek Fire" later used by the Byzantines in the 7th century against the Arabs.[65]

Having failed to breach the walls with the ram, Bessas decided to employ the most traditional yet costly siege method: an escalade (assault with ladders). This method almost always resulted in heavy casualties for the attackers and was therefore often avoided.[66] Notably, the elderly Bessas personally led the assault, intent on scaling the enemy ramparts himself.[67]

According to Apollodorus of Damascus, ladders were much easier to manufacture than siege towers and rams. Materials for them are easy to find and simple to use and repair. On the other hand, they are more dangerous and are under the defenders' total control. It is not difficult to seize a ladder and the people climbing it; when they are placed against the walls, they can be pulled up, smashed, or prevented from leaning against the wall at all. Warriors on a ladder, from the topmost rung to the very last, are in great danger.[68]

For a successful escalade, it was essential to manufacture ladders matching

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July 20, 2005. https://www.iranicaonline.org/articles/lighting-equipment-and-heating-fuel/

64 Gela Gamkrelidze, *Researches in Iberia-Colchology* (Tbilisi, 2012), 174.

65 Its exact recipe remains unknown, although it was prepared in various ways throughout the Near East; one such recipe is noted by the 12th-century Arab author al-Tarsusi. *Sakartvelo da jvarosnuli aghmosavleti Jakh de Vitris tsnobebis mikhedvit* [Georgia and the Crusader East, according to the accounts of Jacques de Vitry]. Translated by T. Tsitlanadze; Introduction, notes, and comments by Andro Gogoladze, Tea Tsitlanadze, Tea Karchava, and Nikoloz Silagadze (Tbilisi, 2015), 227.

66 According to John Lynn, although methods existed for undermining and collapsing walls, doing so was difficult, time-consuming, and easily disrupted; meanwhile, a direct assault resulted in very heavy losses. Consequently, even a small garrison had a significant chance of holding off the enemy. *Feeding Mars logistics in Western Warfare From the Middle Ages to the Present*, edited by John A. Lynn (London, 2020), 34-35.

67 During his first confrontation with the Persians (while serving as the dux of Martyropolis in 531) and throughout the initial stage of the Gothic War in Italy (535–545 AD), Bessas displayed exceptional courage and personally participated in hand-to-hand combat. Prokopios, *the Wars of Justinian* I, 8, 22; V, 5; VI, 1.

68 Apollodorus of Damascus, "Poliorketika" [Poliorcetica], 52.

the height of the wall. A ladder had to be tall enough to reach the battlements but not so long that defenders could easily push it away.[69] Late Roman authors suggest two methods for measuring wall height: using a thread attached to an arrow shot at the wall, or calculating height from shadows cast by a stick of known length.[70] Various types of ladders were used, including jointed ladders for very high walls and rope ladders with hooks, primarily for lower ramparts.[71]

Prokopios' account of the escalade at Petra vividly illustrates the nature of such combat. Despite being over seventy years old and past his physical prime, Bessas personally led the escalade by being the first to climb the siege ladder. The ensuing battle between the Byzantines and the Persians was exceptionally brutal, leaving nearly every participant either dead or wounded. The turning point occurred when Bessas fell from a ladder during a violent struggle at the battlements. As Persian defenders targeted the fallen general, his bodyguards formed a testudo-like "roof" with their shields to protect him. Because of his age, weight, and heavy armor, Bessas could not stand up on his own. He avoided despair by ordering his guards to drag him by his feet away from the wall while maintaining their shield cover. Once he reached a safe distance, he regained his footing and immediately returned to the wall to resume the climb, reinvigorating the Roman assault.[72]

Bessas led the army in a second assault. The Persians, realizing they could no longer withstand the onslaught, attempted to stall through negotiations, but Bessas discerned their intent and continued the attack.[73] Suddenly, the wall collapsed at the spot where the Byzantines had previously tunneled, and the Persians were effectively doomed. They continued to repel the attack for a time until Ioannes the Gouzes, an Armenian, scaled the wall in an unexpected loca-

69 Nosov, *Osadnaya tekhnika: Antichnost' i Srednevekov'ye*, 67.

70 Nosov, *Osadnaya tekhnika: Antichnost' i Srednevekov'ye*, 67.

71 Nosov, *Osadnaya tekhnika: Antichnost' i Srednevekov'ye*, 68. Not only were fixed-size wooden ladders used, but also folding, rope, and leather ladders. For instance, according to Fredegar (a 7th-century Frankish chronicler), the Franks utilized rope ladders. These rope-and-leather ladders were mostly used at night during surprise assaults. Using ladders during a storming operation required exceptional agility from the warriors. Nosov, *Osadnaya tekhnika: Antichnost' i Srednevekov'ye*, 67.

72 Prokopios, *the Wars of Justinian* VIII, 11.

73 Prokopios, *the Wars of Justinian* VIII, 11-12.

tion, killed the guards, and enabled his warriors to occupy the ramparts.[74] The Byzantines took the fortress. The Persian wooden tower from which they hurled incendiary pots was set on fire: "The Persians who were posted in the wooden tower had kindled a huge number of fire-bearing pots in order to burn up the engines, men, and all, by the very number of their projectiles, as the defenders were unable to push them all aside with their poles. But suddenly there sprang up from the south a wind of extraordinary violence that blew against them with a great roar, and somehow it set fire to one of the planks of the tower".[75] The remaining garrison retreated to the acropolis and refused to surrender, forcing Bessas to burn the acropolis down.[76] Archaeological studies at Petra-Tsikhisdziri confirm the occurrence of a fire that destroyed one of the towers and its guards, who were unable to remove their belongings. As archaeologist D. Mindorashvili points out, after the tower's brutal destruction, no one attempted to clear or reuse the site.[77]

Aftermath

A vast supply of food (beans, salted meat, bread) and weaponry was discovered in Petra.[78] Archaeology provides further evidence of the garrison's provisions: alongside Persian coins and late-antique weaponry, hand mills and grains

74 Ioannes Gouzes was an exceptionally brave warrior who had distinguished himself in single combat on other occasions. He killed a prominent Alan warrior after the battle at the Hippis River (549 AD), during the capture of the Persian camp. Prokopios, *the Wars of Justinian* VIII, 9.

75 Prokopios, *the Wars of Justinian* VIII, 11.

76 "At the command of the general, the Romans hurled fire into the acropolis, thinking that in this way the enemy would surrender themselves. As the flames spread and grew, the barbarians, with disaster before their eyes and knowing well that they would quickly be burned to ashes, and having no hope nor seeing any possibility of saving themselves by fighting, still they did not want to fall into the power of their enemy and were burned to death, all of them together with the acropolis, while the Roman army were amazed at what was taking place. It then became clear how much value Chosroes placed upon Lazike, for he had chosen the most notable of all his soldiers, assigned them to garrison Petra, and deposited there such an abundance of weapons that when the Romans took possession of them as plunder, five men's equipment fell to each soldier, in spite of the fact that many weapons had been burned on the acropolis". Prokopios, *The Wars of Justinian* VIII, 12.

77 Mindorashvili, *Archaeological excavations at Petra-Tsikhisdziri*, 12.

78 Prokopios, *the Wars of Justinian* VIII, 12.

of wheat and barley (likely for livestock) were found.[79]

The garrison also had a secure water supply. Following the first siege and the capture of the city by Chosroes Anushirvan, the Persians had split the incoming water into three parts. They dug a deep trench and installed three pipes: one at the very bottom, covered with stones and debris; a second hidden above it; and a third built above ground, in plain sight. Thus, the conduit was a secret three-tiered structure. The Romans only managed to cut two pipes, failing to locate the third.[80] Depriving a garrison of water was a standard siege tactic; examples include Cimon at Eion (5th c. BC), Caesar at Uxellodunum (51 BC)[81], the Persians at Dara (573/4 AD), and various medieval sieges such as Carcassonne in 1209.[82]

Bessas sent the captives to the Emperor and razed the walls of Petra to the ground, fearing that if the enemy recaptured this powerful stronghold, it would jeopardize Byzantine hegemony in Lazike. The Emperor praised him for his courage and his strategic foresight in demolishing the walls.[83] After its destruction, Petra lost its former significance in the Lazic War, though it remained strategically relevant due to its location. Among the battles of the Lazic War, the siege of Petra stands out not only for its duration but also for the intensity of combat and the diversity of siege methods employed.

The battles of the Lazic War, encompassing both field engagements and sieges, serve as exemplary models of warfare in Late Antiquity. This conflict retained traditional elements characteristic of the classical era—such as specific siege engines and established tactical maneuvers like the infantry phalanx deployed against cavalry during the battle at the Hippis River. Simultaneously, it showcased the innovations of the Late Antique period: the burgeoning role of cavalry, the emergence of "universal" soldiers with diverse ethnic backgrounds and heterogeneous equipment within imperial armies, and the sophisticated development of Byzantine archery and mounted units.

The poliorcetic (siege) methods employed during the Lazic War represent a synthesis of techniques typical of Ancient, Late Antique, and Medieval warfare.

79 Mindorashvili, *Archaeological excavations at Petra-Tsikhisdziri*, 35.

80 Prokopios, *the Wars of Justinian* VIII, 12.

81 Duncan Campbell, *Besieged: Siege Warfare in the Ancient World* (Oxford, 2006), 32.

82 Purton, *Early Medieval Siege*, 26, 126, 198, 293, 340-341.

83 Prokopios, *the Wars of Justinian* VIII, 12.

At the same time, this period reveals a clear drive toward innovation and the adaptation of previously unknown military methods. A prime example of this is the lightweight battering ram engineered by the Sabirs, which they constructed during the sieges of Petra and Archaeopolis.

The difficulty of capturing these fortresses was often exacerbated by the relatively small size of the field armies and the logistical complexities of maintaining long-term supply lines. Following the loss of the fortress-city of Petra, the Byzantines spent years attempting to reclaim it. Conversely, the Persians—acting as the aggressors in the Lazic theater—frequently struggled to reduce the well-fortified Lazi-Byzantine strongholds.

Furthermore, the period marked an increase in the importance and quality of the infantry[84], alongside unprecedented advancements in siege technology in Sasanian Iran. Compared with the earlier Parthian period, the Sasanians demonstrated a far greater capacity to capture heavily fortified strongholds during the Lazic War. For both belligerents, the occupation of fortified positions was a primary strategic objective; consequently, the pivotal engagements of the war frequently coalesced around key strategic sites such as the fortresses of Petra, Phasis, and Archaeopolis.

84 In the Lazic War, the Persians made extensive use of Daylamite infantry. For more details, see the following article: "The Daylamite Involvement in the Lazic War (541-562)", *Historia i Świat* 11 (2022), 165-172.

Counterweight trebuchets at the siege of Nicaea (1097), throwing heads of Muslims over Ramparts. From BnF Ms Français 2630 f. 22v c. 1270. David Nicolle, *Medieval Siege Weapons (1): Western Europe AD 585-1385*, Osprey Publishing, 2002, p. 21 Wikimedia Commons.

Siege and Fortification in Medieval Europe

by John France
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> The first part of fighting is the shooting of arrows, then the pointing of spears, then the thrusting of hem to left and right and then the drawing of swords. That's all there is to it.[1]

Thus a ninth century Arab writer characterised the nature of war, and his emphasis on close quarter fighting with edged weapons, which forces men on foot or horse, to confront one another in an intimate way, explains the vital supremacy of fortifications in the Middle Ages. The man crouched behind a palisade set on a pile of earth has an obvious advantage over the fellow climbing up, while he who stands on the walkway of a stone wall is in a much better position than one climbing a ladder to reach him. It is, therefore, no accident that castles, mostly ruined, occasionally barely discernible, are the strongest reminder of the medieval past in Europe.

Of course, medieval people enjoyed fine models from Rome, primarily city walls, for the Romans were great fortifiers. They inherited an ancient tradition which had developed almost all the techniques of building strong defences long before them.[2] But there were many kinds of fortifications. Britain is marked by a number of earthwork dykes, of which Offa's Dyke, 177 miles (285 km), roughly corresponding to the border between England and Wales, and Wansdyke (Woden's dyke), 35 miles, (56 km), are the best known. However, we know

1 al-Harith b. Abi Rabi'a quoted and translated in Hugh Kennedy, *The Armies of the Caliphs. Military and Society in the Early Islamic State* (London: Routledge, 2001), 23.

2 For a summary see J. France, *Perilous Glory. The Rise of Western Military Power* (London: Yale, 2011), 23-29.

little about them or when and how they were operated. Villages in France and the Netherlands were sometimes protected by *haie*, small hedged earthworks. In some places there are traces of much bigger earthwork and timber enclosures, as at Le Puiset, built to protect the local population in times of trouble, but we know little of them.[3] Armies in the field commonly built field fortifications of earthwork and timber: in 554 a Frankish army ravaged Southern Italy and, when challenged by a Byzantine force, constructed a mighty earthwork by the river Volturno, only to be defeated.[4] There is no doubt that Charlemagne's great effort to conquer the Saxons hinged upon establishing Frankish fortifications and destroying native ones. Both sides used earthwork and timber to protect these bases.[5]

We have close knowledge of actual systems of fortification, in what we now call France, England and Germany. Charles the Bald (843-77), faced by fast-moving Viking raids which penetrated France via its rivers, tried to draw the invaders into diplomacy, but ultimately improved his army, established fortifications at key point and built fortified bridges across the great rivers.[6] Paris, in the ninth century, was centred on an island in the Seine, the Île de la Cité. Thanks to Charles' efforts, by 885-86, when the city was attacked by a large Viking army, it was connected to the north bank by a stone bridge guarded by an incomplete stone tower, while a wooden bridge and tower linked it to the southern (in modern terms "Left") bank. It was around these structures that an epic siege erupted. This was a savage siege but ultimately it ended in a compromise. The Emperor Charles the Fat (881-87) permitted the Vikings to continue upstream to ravage his enemies in Burgundy even though they had been unable to take Paris, whose citizens cared little for the Burgundians. [7]

Alfred of Wessex (871-99) was faced by the same Viking enemies: they could come by sea or by land from the Midlands and North which they had conquered. In response, he constructed "*burhs*", a network of fortified settlements in which the local population could shelter. These were earthwork and timber enclosures.

3 J. France, *Medieval France at War. A Military History of the French Monarchy 885-1305* (Leeds ARC, 2022), 79.

4 J. Haldon, *The Byzantine Wars* (Cheltenham: History Press, 2008), 1.

5 B. S. Bachrach, *Charlemagne's Early Campaigns (768-777)* (Leiden: Brill, 2013).

6 J. Nelson, *Charles the Bald* (London: Longman, 1992), 2011-219.

7 *Viking Attacks on Paris. The bella Parisiacae urbis of Abbo of St Germain* ed. N. Dass (Leuven: Peeters, 2007); France, *Medieval France at War*, 50-53.

A system of compulsory service provided garrisons, and although they were not individually especially strong, they could resist initial attacks and pin down the enemy until a parallel system of raising a field army could attack them. In the 890s this definitely annulled Viking attack.[8]

The German kings, who were also dukes of Saxony, faced attack by the Magyars of what is now Hungary. These were steppe horsemen, lightly armoured fierce fighters whose speed and hitting power made them deadly enemies. Henry I (919-36) bought them off for a period during which he built up his cavalry and began to construct a network of fortresses, enabling him to crush them at the battle of Riade in 933. His son, Otto I (936-73) defeated them again at the Lechfeld in 955, but on this occasion the local garrisons massacred the survivors as they took flight, ending the Magyar threat.[9]

Such networks of fortifications were a terrible burden on medieval monarchs and their subjects. Charles the Bald's system was dissipated in the succession problems after his death. In England *burhs* survived as local centres, and some like Winchester became cities with walls, but within half a century the defensive network had vanished - to the great profit of later Viking attackers. Equally in Germany some centres became important towns, but the network disappeared as the enemy weakened and political circumstances changed. The real lesson of these cases is that while strength of fortification is important, in the end none could hold out without hope of relief. It was the combination of fortification and a strong Anglo-Saxon army which made Alfred's system successful. In Germany the kings built up heavily armed cavalry and at the Riade Henry I advised his cavalry:

> When you sally out to the field of battle let noone ride faster than another but keep together. The shields of each should guard his neighbour so that they can receive the first volley of arrows from the enemy [Hungarians]. Then charge very fast before the enemy can fire again for the weight of your armour will prevail. [10]

8 R. Lavelle, *Alfred's Wars. Sources and Interpretations of Anglo-Saxon Warfare in the Viking Age* (Woodbridge: Boydell, 2010).

9 C.R.Bowlus, *The Battle of the Lechfeld and its Aftermath, August 955. The end of the Migrations in the Latin West* (Aldershot: Ashgate, 2006).

10 Liudprand, *Antapodosis* ed. J.Becker (Hannover: MGH, 1915) Bk 2 ch. 31, 51-52 and see also Widukind, *Res gestae Saxonicae* ed. P.Hirsch and H.E.Lohmann (Hannover: MGH, 1935), Bk 1 ch. 38, 58.

Given their success why did such networks vanish? Armies and fortifications were incredibly expensive and a great pressure on society. All monarchies had to depend on the social and political elites who saw themselves as enjoying a high degree of autonomy in political and military affairs. Fundamentally medieval society was based on an agriculture in which, for every seed of grain sown the peasant typically could reap only 5, and in a bad year less. Medieval people had ingenuity and skill, but only limited means so the whole structure of society had to march to the pace of the agricultural year. In consequence armies and military enterprises, with very few exceptions, were short-lived, and because of that relatively incoherent. These characteristics became more evident as political circumstances changed.

The Castle: Origins

Castles had rather different origins from the royal networks already mentioned. In his Edict of Pîtres of 864 Charles the Bald showed he was well aware of the dangers of private fortifications:

> And it is our wish and express command that if anyone has built castles, fortifications or palisades at this time without our permission, such fortifications shall be demolished by the beginning of August, since those who live nearby and round about are suffering many difficulties and robberies as a result.[11]

The Franks were dominated by a bickering and feuding aristocracy who, even under a great ruler like Charlemagne, enjoyed a monopoly of political office - it was they who became Counts, Dukes and Margraves, the key territorial administrators. They were supervised by the *missi dominici,* travelling inquisitors, but even they were drawn from this class. In practice, therefore, they enjoyed considerable political autonomy and the Carolingian kingship strengthened their power over others.[12] This was backed by their substantial military ret-

11 *Edict of Pîtres*, trans. Simon Coupland consulted on 08.04.25 at https://www.academia.edu/6680741/The_Edict_of_Pîtres_translation.

12 C.West, *Reframing the Feudal Revolution. Political and Social Transformation between Marne and Moselle, c.800-c.1100* (Cambridge: Cambridge University Press, 2013); S.D.White, *Rethinking kinship and feudalism in Early Medieval Europe* (London: Routledge, 2006).

inues. When the Carolingian hold on power in France was challenged in a conflict which endured for a century by the rival dynasty of the Capetians monarchy ceased to count for much. The great aristocrats, to whom governmental power had been confided, were able to exercise it for their own benefit. Their actual lands were scattered across and even beyond the areas in which they claimed to administer justice and government, but houses built on them were vulnerable to attack by rivals. The castle was a solution to this problem being a fortified home, garrisoned by dependent knights, built where a lord had lands, serving to coerce the agricultural population and protect the family's wealth from rivals. The fate of Egfrid illustrates how important this was:

> 'At a certain villa Egfrid [friend and ally of Charles the Bald] refused to emerge from the strongly fortified house in which he had shut himself up; so they set fire to it and drove Egfrid out, chopped off his head and threw his body into the flames.' [13]

As kingship was disputed kings could no longer manipulate aristocrats by offers of office or grants of land, so dependence on land and governmental rights over it increased making protection the more urgent. This was the more urgent and important because in the tenth century peasants expanded the area of agriculture and made such local rights very valuable. And conflict between the great men, the need to cater for family or create and maintain alliances permitted the rise of middle-ranking aristocrats so that by the 11th century castles were becoming quite common, especially in France south of the Loire where contact with the monarchy was becoming rare. As these multiplied it became very difficult for kings, dukes and counts to maintain control over them. The dukes of Aquitaine, for example, lost control of the Limousin to a group of aggressive vice counts.[14] Although such great men retained their eminence they depended greatly on playing off their nominal subordinates against one another.

Underlying this process, around 1000 a Burgundian cleric noted the impact of the new agricultural wealth on the church:

> Just before the third year after the millennium, throughout the whole

13 *Annals of St Bertin* ed. J.Nelson (Manchester: Manchester University Press, 1991) Year 868,143.

14 J.France, "People against mercenaries. The Capuchins in Southern Gaul," *Journal of Medieval Military History* 8 (2010), 1-22.

> world, but most especially in Italy and Gaul, men began to reconstruct churches, although for the most part the existing ones were not in the least unworthy. But it seemed as though each Christian community were aiming to surpass all others in the splendour of construction. It was as if the whole world were shaking itself free, shrugging off the burden of the past, and cladding itself everywhere in a white mantle of churches. Almost all the episcopal churches and those of monasteries dedicated to various saints, and little village chapels, were rebuilt better than before.[15]

His "white mantle" could soon have been applied to castles which flowered as the century proceeded. In Italy a parallel process known as the *incastellamento* began at the same time in response to the weakness of the monarchy.[16] But castles were not simply defensive. We are told in a charter that the Lord of Saumur "terrified Fulk [Nerra, Count of Anjou 987-1039] as its garrison rode about ravaging his lands." Horsemen based in a castle could patrol, to defend or attack, up to 15 miles in a day from their base. And castles were built to attack. Around the year 1000 Audoin bishop of Limoges (990-1014), supported by the duke of Aquitaine, built a castle at Beaujeu to protect his lands, but Jordan II of Chabannes saw this as a provocation and defeated his forces.[17] Of William the Conqueror his biographer remarked:

> This was his chosen way of attack: to strike fear into the settlement by frequent, lengthy expeditions in that territory, to lay waste the vines, fields and domains, to capture fortified places and put garrisons in them wherever it was desirable; finally to attack the region relentlessly with a great multitude of troubles.[18]

Richard I (1189-99) built Château Gaillard in two years (1196-98) as a base for his projected reconquest of the Norman borderlands seized by the French monarchy during his absence on crusade.[19]

Kings had greater resources than aristocrats but even the strongest monarchs

15 Rodulfus Glaber, *Historiarum Libri Quinque* ed. J.France (Oxford: Clarendon, 1989), 114-17.

16 A.A.Settia, *Proteggere e dominare: Fortificazioni e popolamento nell'Italia medievale* (Roma: Viella, 2011).

17 Ademar of Chabannes, *Chronicon* ed. P.Bourgain, R.Landes and G.Pon (Turnhout: Brepols, 1999), CCM 129, Chap. 42, 163.

18 William of Poitiers, *Gesta Guillelmi* ed. and tr. R. H. C. Davies and Marjorie Chibnall (Oxford, 1998), Chap.38, 61.

19 J.Gillingham, *Richard I* (London: Yale, 2002), 304.

could not prevent great men from constructing them. In France the monarchy struggled with the castellans. Concerning the castle of Monthéry, which stood on the route between the royal cities of Paris and Orleans, Philip I of France (1060-1108) is said to have remarked to his son:

> Beware, my son, keep watch and guard that tower; the distress I have suffered from it has nearly made an old man out of me. Its plots and vile treachery have never allowed me good peace and quiet.[20]

The Counts of Champagne dominated the valley of the Marne with no less than six castles, and they had fortified cities like Troyes and many castles elsewhere. Yet Brionne remained a bone in the throat until its acquisition in 1121.[21] In France castles spread like a rash, so that in the general area of Capetian dominance, the Île de France, some 148 private castle sites have been identified.[22] However, the monarchy could generally count on the support of senior clergy, who often controlled cities and castles. In the longer run as towns developed their people looked to the monarchy for aid against aristocratic pretentions and violence, providing finance and the shelter of their walls.

In Germany, where the outbreak of civil war under Henry IV (1056-1105) provided a powerful stimulus, it has been calculated that between the eleventh and fifteenth centuries 10000 castles were built.[23] The Hohenstaufen dynasty, kings and emperors in the twelfth and thirteenth centuries, were named for their home castle. In Italy the Plain of the Po was dominated by great trading cities with formidable fortifications who were very frequently at war with one another. Many of the nobles of the countryside moved into the cities where they built towers, such as can still be seen at San Gimignano, while preserving castles on their estates. War between the cities usually consisted of attacking not cities themselves, but outlying fortifications and castles to chip away at the *contado* of the enemy city and force concessions.[24]

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20 Suger, *Deeds of Louis the Fat* ed. R.C.Cusimano and John Moorhead (Washington: Catholic University, 1992),40.

21 M. Bur, *La formation du Comté de Champagne v.950-1150* (Nancy: Université de Nancy II, 1977), 277-79.

22 A.Châtelain, *Châteaux forts et féodalité en Île de France du xi*^{ème} *au xiii*^{ème} *siècle* (Paris: Créer,1983), 225-27.

23 W.F.Schueri, *Medieval Castles and Cities* (London: Cassell, 1978), 87.

24 J. France, "Thirty Years of War: the cities of the Lombard Plain," in R.G.Khamisy, R.Y.Lew-

After the Norman conquest of England William I (1066-87) gave lands to his Norman followers, establishing, however, quite harsh terms to control them. But even in England the Conqueror and his successors needed aristocratic support and castles multiplied. When King Stephen (1135-54) took the throne many lords favoured his rival, Mathilda, and the ensuing war developed into a series of local struggles in which sieges of castles predominated.[25]

Aristocrats were not necessarily building castles out of hostility to royal power, but when it was weak they had to guard their interests. And castles were not just block-houses. They were residences, social centres, stores and status symbols, deeply treasured by their owners, not least because from them their bully-boys, the knights, dominated the peasants and assured collection of rents and dues. When Robert Giroie's castle of St Céneri was taken by surprise and burned by his enemies a chronicler recorded of its owner: "So at one blow the noble knight was utterly disinherited and forced to live in exile in the houses of strangers."[26]

But castles were clearly seen as having vital military and strategic importance for Ordericus comments:

> In the lands of the English there were very few of those fortifications which the French call castles: in consequence the English, for all their martial qualities and valour, were at a disadvantage when it came to resisting their enemies. [27]

Ordericus was probably wrong because England had fortified *burhs*, and many aristocratic homes were fortified.[28] But he shows the importance contemporaries attached to castles.

In 1184 the county of Hainaut was invaded by three allied armies led by the count of Flanders. Baldwin V of Hainaut was greatly outnumbered and could not possibly challenge such overwhelming force in the field. He abandoned

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is, V.R.Shotten-Hallel (eds), *Exploring Outremer I Studies in History in Honour of Adrian J.Boas* (London: Routledge, 2023), 127-41.

25 D.C.Crouch, *The Reign of King Stephen, 1135-54* (London: Routledge, 2016).

26 Ordericus Vitalis, *Historia aecclesiastica* ed. M.Chibnall, 6 vols (Oxford: Clarendon, 1969-79), 3: :294-95. 4: 295-96.

27 OV 2:219.

28 G.Beresford, *Goltho: the development of an Early Medieval Manor, 850-1150* (London: English Heritage, 1987).

weak castles and ordered his vassals to concentrate their men in the strongest places they held, and to devastate the countryside. To encourage them he sent round the following message:

> Take comfort and be strong, because our enemies will withdraw at some time, and leave our lands to us, because they cannot take the lands with them.[29]

These allies all had different reasons for joining the attack, and when the prospect of a long war in the face of a determined defender loomed, they withdrew. It was typical of medieval armies that short-term issues were of overwhelming importance. And after all "they cannot take the lands with them." And such problems persisted. In 1310 Frederick of Austria attacked the castle of Schaerding, but his hastily gathered force soon retreated in the face of poor logistics, bad weather and loss of horses.[30] Baldwin V was fortunate that his vassals remained loyal; in 1216 Prince Louis of France rallied the rebellious English barons against King John. Many lords went over to Louis and their castles strengthened the revolt, but some remained loyal and royal castles were numerous and strong. [31] The resistance of Dover to Louis' attack was crucial to the royalist cause. Under the determined leadership of Hubert de Burgh a well-supplied garrison of 140 knights and many others tied up powerful elements of the rebels for some two years - blunting the threat to the English monarchy.[32]

The Castle and its Fortifications

Much recent writing has stressed the many functions of the castle.[33] Castel del Monte, built by the Emperor Frederick II in Apulia c.1240, was primarily a

29 Gilbert of Mons, *Chronicle of Hainaut* tr. Laura Napran (Woodbridge: Boydell, 2005), Chap.114, 95.

30 *Annales Osterhovenses* 754-1433, MGH SS 17:556.

31 S.McGlynn, *Blood Cries Afar. The Forgotten Invasion of England 1216* (Stroud: Spellmount, 2013).

32 J.Goodall, "Dover Castle and the Great Siege of 1216," *Château Gaillard: Études de castellologie* médiévale (2000), 91-102.

33 C.Coulson, *Castles in Medieval Society: Fortresses in England, France, and Ireland in the Central Middle Ages* (Oxford: Oxford University Press, 2004) has been highly influential in this respect.

"pleasure palace."[34] Bodiam castle in East Sussex was constructed in 1385 as a status symbol by a successful soldier who made his fortune in the "Hundred Years War." [35] In fact, this approach is part of a general tendency amongst historians to play down violence and its importance in medieval history. But, of course, given their origins as residences, few castles can be seen as mere bunkers. In the case of the examples above it is worth noting that both were built in peaceful areas, and they were still highly defensible and shared features with the more obvious bunkers of their age.

It is generally observed that most castles built between the mid tenth century and the later twelfth were of earthwork and timber. There were exceptions. Doué-la-Fontaine was a ninth-century stone-built great hall, fortified by the count of Blois about 950 with the addition of an upper storey. Around 1000 this whole structure was buried in a great earth motte and a donjon (keep) built on top.[36] Fulk Nerra count of Anjou (987-1040) was a great builder of castles, and it seems as if from early in his reign he built in stone with Langeais completed before the end of the tenth century.[37] The Conqueror built the great stone White Tower to overawe London.[38] But these were exceptions. Earthwork and timber was for long the norm. This can be connected to the reasons why lords wanted such structures. They were seeking to protect, or extend, wealth-giving lands or the rights over them. Not all lords had strong elevated sites, but earthworks could be built almost anywhere Moreover they were relatively cheap. No special skill, such as that of the mason, was required, and most aristocrats had, in one way or another, acquired the power to demand manual labour from their peasants. By contrast, in the Holy Land, the crusaders found an absence of timber, but a plethora of ancient ruins whose ready cut stone they therefore used

34 G.Masson, *Frederick II of Hohenstaufen. A Life* (London: Secker and Warburg, 1957), 193-99.

35 C.Coulson, "Some analysis of the Castle of Bodiam, East Sussex", *Medieval Knighthood* 4 (Woodbridge: Boydell,1992), 51–108.

36 M. de Boüard, "De l'aula au donjon:les fouilles de la motte de la Chapelle à Doué-la-Fontaine (x-xi siècle)," *Archéologie Médiévale* 3-4 (1973), 5-110.

37 B.S.Bachrach,"The cost of Castle building: the case of the tower at Langeais, 992-92," in *The Medieval Castle: Romance and Reality* ed. K.L.Ryerson and F.Powe (Minnesota:Centre for Medieval Studies, 1991), 47-62.

38 R.A.Brown, *English Castles* (London:Chancellor, 1970), 15.

to build castles. Saforie castle, for example, where the crusaders held a fractious conference before the battle of Hattin in 1187, has ancient sepulchres embedded as corner stones.

Earthwork and timber castles were very effective in defence.[39] Two types dominated. The Ringwork was simply a circular ditch with the spoil of the excavation carefully piled inside, thus presenting an attacker with a ditch and a steep ascent to a wooden palisade. This was probably the kind of protection constructed around Goltho manor. It clearly has much in common with the marching camps used by the Franks and others since time immemorial. In the twelfth and thirteenth centuries the rival cities in the plain of the Po frequently constructed camps of just this kind in the course of their attacks upon one another.[40]

A more complex type was the motte and bailey. This was built in much the same way. A circular ditch was created, and the earth piled inside in a mound around the lower part of the timber framework of a tower which could then be furnished with the required number of stories. Some considerable care was needed to distribute the earth across the mound to make it stable. In 1066 William of Normandy brought with him a prefabricated castle, and in the Bayeux Tapestry his labourers can be seen painstakingly layering the earth of the motte to take the weight which would be placed on it.[41] The tower on the motte could be connected by a bridge across the ditch which separated it from the bailey, if there was one, which was essentially a ringwork protecting stores, stables and other assets. If this was breached the owners of the castle could seek refuge in the wooden tower. No doubt some of these structures were better or bigger than others, but what we know of ditches suggests they were formidable. In 1091 William II of England and his brother issued decrees in an attempt to end warfare and castle-building in Normandy. Amongst other provisions it was decreed:

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39 The key work is R.Higham and P.Barker, *Timber Castles* (London: Batsford, 1992).

40 On Goltho see above p.oo, n.oo: J.France, "Campements fortifies, sièges et engins de siège dans la vallée du Po au XIII siècle,» in N.Prouteau, E. de Crouy-Chanel and N. Faucherre (eds), *Artillerie et Fortification 1200-1600* (Rennes : Presses Universitaires de Rennes, 2011), 33-40.

41 *The Bayeux Tapestry* ed. D.M.Wilson (London: Thames & Hudson, 1985), 49-50. The layers are carefully picked out in different colours.

> No-one in Normandy may dig a ditch in open country unless from the bottom of this ditch the earth can be thrown out of it without the aid of a ladder, nor may he set up more than a palisade which must have neither redan nor rampart-walk.[42]

This suggests that ditches could be very deep, and by extension, mottes or earthwork redoubts very high. Anyone who has seen the massive earthworks at Berkhamstead castle, built very quickly after 1066, will appreciate the strength conferred by excavation. The earthworks cover 11 acres: the motte is 40 ft high, and the bailey 300x500 ft, the whole surrounded by a double bank and ditch.[43] Not the least of the advantages of a motte was protection against fire. In the Bayeux Tapestry the Normans attack Dinan, but are shown having to mount the motte to use it, exposing them to the defenders. Fire arrows are, contrary to Hollywood movies, relatively poor at the job, while sticky fire was rare in the west.[44]

The number of such earthworks is immense. In England the new Norman aristocracy created a rash of such fortifications to hold down their new lands, and they continued to be created, though at a much slower rate, right through the Middle Ages. English heritage suggests that there are some 700 such sites in England and Wales. There is no single pattern. Some are classic motte and bailey, others just mottes or ringworks, a few utilise the sites of prehistoric earthworks and many are modified natural features. A lot of these structures had very short lives, and are long decayed. The motte at Pentre where the M4 crosses the river Lloughor is commonly dismissed as a heap made during building of the road. But many others were developed and modified over the years, often with stone castles erected upon them. Most of the castles held for the count of Hainaut in 1184 would have been earthworks.

The rising tide of stone castles in the twelfth century owed a great deal to the increased wealth of Europe, much of which was creamed off by the aristocracy. They offered their owners greater comfort, provided an intimidating element in the landscape, and were highly flexible. Roman city walls provided a model

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42 F.Barlow, *William Rufus* (New Haven: Yale, 1983), 286-87.

43 P.M.Remfry, *Berkhamsted Castle and the Families of the Counts of Mortain, the Earls of Cornwall and the Crown* (Worcester: SCS, 2009).

44 BT 23.

for construction. There was no fixed pattern and the primary determinants of layout were the sites available and the wealth of the owner. A common feature of prominent castles in the eleventh and twelfth centuries was a great square or oblong donjon tower. One of the earliest was Loches begun by Fulk Nerra c. 1035 and completed by his son. It stands 23.3 by 15.4 metres (76 by 51 ft) with walls 2.8 m (9 ft 2 in) thick. It is 37 m (121 ft) high, and each storeyof the four storeys is a single room. In England the White Tower is of the same magnitude, while Hedingham is a more modest example. Its keep is 16 m (53 ft)x 18m (58 ft) and rises through five floors to 21 m (70 ft), while turrets rise up to 7.6m at each corner. It stands on a rock spur dominating the nearby countryside of Suffolk and Essex.

Around many of these donjons there were earthworks, soon replaced or augmented by outer walls to form a concentric defence. Plain walls, up to 10m high, were a substantial obstacle, especially if, as was commonly the case, they were built on earthworks. However, the addition of a walkway, protected by a wall with merlons (crenelations) offered defenders cover, making them even more formidable. Towers, which were higher and projected outwards from the wall, enabled the defenders to take attackers in the flank. Dover, reconstructed under Henry II (1154-89), had a mighty square five storey donjon at its heart, surrounded by a high curtain wall with massive square towers, and the whole was encircled with another curtain with towers. In the thirteenth century this outer wall was extended to cover the whole of the plateau on which the castle sat, and the main gate rebuilt massively: by this time many of the towers projecting from the wall were, in the new fashion, round. These certainly offered a better all-around view than square towers which, however, continued to be built.

Perhaps the greatest castle in twelfth century Europe was Château Gaillard, constructed by Richard I, 1196-98, on a rock spur high above the river Seine. It was connected to the fortified town of Les Andelys by the river and supported by other castles in the region. With cliffs on three sides, it could only be approached from the east where a huge and strongly fortified outer bailey blocked the way of any attacker. This was cut off from the inner baily by deep rock-cut ditch beyond which another strong bailey faced the attacker. This, in turn, was connected by a bridge to the inner bailey with its great tower. In England the greatest castle was Caerphilly, a private structure begun in 1268 by the Claire family: it is

surrounded by a huge artificial lake which kept throwing machines at bay and prevented mining.[45] Only the huge royal castles built by Edward I (1272-1307) to control North Wales rivalled but never surpassed it. This network of castles in North Wales served as bases to put down any rebellion and, by that very fact, strengthened them. But they were in themselves massive enough to provide time for relief to gather. They were hugely expensive and the resources of much of the English kingdom were drawn on for construction,[46] but compared to the cost of continual mounting of huge expedition this was an economy. And privileged towns, erected in the shadow of such monsters, generated taxation to offset their costs. Only kings and the very greatest princes could afford such structures. They were massively built and their complex designs with successive lines of defence made penetration difficult. Gates were always weak points. Barbicans, enclosed the immediate approaches, providing outlying defence. The gates themselves increasingly took the form of two linked round towers in a single block through which the entry ran like a tunnel. It was blocked by portcullises and in its roof and walls were "murder holes." But such refinement was not common and, in any case, more modest measures could be very successful. In 1214 King John invaded France from the south while his allies attacked from the north. John enjoyed much success but this was halted by the resistance of the castle of La Roche-au-Moine. It was not a particularly strong place but the garrison was determined and bought time for the French to mobilise and block John's attack.[47] When Toulouse was besieged by the Albigensian Crusade in 1217 its fortifications had been largely demolished, but it was too big to surround and an attempt to storm it failed in the narrow streets with defenders throwing missiles from roof-tops. In the end the siege failed with the death of its leader, Simon de Montfort, in 1218.[48]

Few cities could afford truly elaborate fortifications. In fact, many city walls perhaps were intended to enforce tax collection as much as to resist attack. But

45 D.Renn, *Caerphilly Castle* (Cardiff: CADW, 2002).

46 For a comprehensive view see *The History of the King's Works I and II The Middle Ages,* ed. R.A.Brown, H.M.Colvin, A.J.Taylor (London: Stationery Office, 1963), 293-408.

47 France, *Medieval France at War*, 134.

48 L.W.Marvin, *The Occitan War, A Military and Political History of the Albigensian Crusade, 1209-18* (Cambridge: Cambridge University Press, 2008), 268-96.

in Italy, where the cities often fought one another, the citizen armies were a real defence, no matter how modest the actual fortifications. But the real challenge offered by a city was, in an age of small armies, its size. Crema, a small city with powerful fortifications including a double wall, held out against Frederick Barbarossa for six months 1159-60, while the siege of Milan, much bigger but indifferently fortified, 1161-62 took almost a year.[49] Frederick II had magnificent armies but he failed before Brescia in 1238 and Parma in 1248.[50] Cities could be well-fortified, like Carcassone which in the late 13th century received a double set of walls, but even without such refinements they could resist siege. As long as the citizens acted carefully. In July 1209 a crusading army besieged Béziers. The citizens were confident that this huge of army of 20000 would soon move on unable to feed itself for long. The citizens harassed and taunted the attackers, but failed to shut their gates which the crusader infantry poured into for a great massacre.[51]

Siege Warfare

Besieging a castle or city created enormous organizational and logistical problems for the attacker. Assault, entering the place over, under or through its walls, was bound to be a bloody affair if the defenders were determined. Philip II of France besieged Château Gaillard in September 1203, but only after he had seized nearby fortresses and captured the fortified town of Les Anelys which was connected to the castle. A relief expedition was then fought off. A strong camp was established by the south wall and a series of assaults began, but success came only in May 1204. Philip had raised a very large army to tackle a fortress with a garrison of 40 knights and 120 lesser men. French losses were heavy but included only four knights, so the burden of loss fell on mercenaries and poor foot.[52] This was a huge effort, justified only by the scale of the Anglo-Norman war. The costs of such an effort were only justified if the rewards were great. Bribery of garrisons was cheaper. The siege of Antioch on the First

49 France, *Western Warfare*, 110, 14.
50 Masson, *Frederick II*, 285-87, 344-47.
51 Marvin, *The Occitan War*, 37-45.
52 France, *Medieval France at War*, 127-29.

Crusade ended after eight months when a garrison commander was bribed.[53] Quite commonly siege ended with an agreement but things did not always go smoothly. In 1104 Baldwin I of Jerusalem besieged Acre and was happy to offer generous terms when the citizens offered to surrender. But he had the aid of many Italians ships and troops who wanted plunder, and they attacked the citizens as they left the city.[54]

Surprise, of course, as in the case of St Cénéri, was effective. Castles had to be prepared for siege. Garrisons had to be reinforced and extra food laid in. The gates had to be strengthened, areas cleared of food sources and defences improved. Hoardings had to be built; these were wooden structures cantilevered from the wall or tower enabling archers to cover blindspots and to drop stones on enemies at the base of the wall from which they projected. And catapults had to be erected to counter those of the enemy. But surprise was difficult to achieve as news of preparations inevitably travelled.

Assault was likely to be bloody, so blockade was an alternative. This required the attackers to create shelter and to establish lines of supply, which Philip did by careful preparation at Château Gaillard in 1203. In July 1247 Emperor Frederick II besieged Parma, establishing a strong camp, entitled Vittoria, so that by February the city was starving. Frederick left the siege to hunt and the garrison, by now desperate, made a major sally and destroyed the attacker. The loose structure of medieval armies made blockade very risky.

A third strategy, which often accompanied assault or blockade, was to destroy the countryside round about, so that the defenders faced grave difficulties whatever the outcome of the actual siege. In 1144 Turks had seized Li Vaux Moise near Petra. Baldwin III of Jerusalem (1143-63) realised that the inhabitants depended on cultivation of olive trees, and it was decided: " therefore, to root out the trees and burn them." The Turks were then ejected by the local population and the castle returned to the Franks.[55] On 1 May 1179 Richard

53 Anonymous, *Gesta Francorum et aliorum Hierosolimitanorum* ed. R.Hill (Edinburgh: Nelson, 1962), 44-45.

54 J. France, "Surrender and capitulation in the Middle East in the Age of the Crusades," in Holger Afflerbach and Hew Strachan (eds), *How Fighting ends - a History of Surrender* (Oxford: Oxford University Press, 2012), 82 [73-84].

55 Kennedy, *Crusader Castles*, 25-27.

Lionheart attacked Taillebourg, then thought impregnable because there were cliffs on three sides, and the fourth was protected by a well-fortified town. On 8 May Richard set about destroying everything in the countryside. This provoked the townspeople into a sally, which Richard crushed, following them into and seizing the town. Deprived of the supplies there, the castle soon surrendered.[56]

If assault was contemplated, the attacker had a choice of going over, under or through the walls before him. In practice at a major siege all three would be attempted. In combination, of course, with blockade, for apart from anything else siege was a psychological struggle and a sense of isolation was destructive of morale.

Even a simple fortification could be formidable. In 1111 Louis VI of France, in alliance with Theobald of Blois, decided to attack Hugh of Le Puiset. This was an earthwork enclosure, a ditch and bank crowned with a palisade, with a motte in one corner. Louis fortified nearby Toury, which belonged to the abbey of St Denis, and stocked it with food. The royal army drove Hugh's forces into the castle, and tried to burn the main gate with blazing carts. Theobald attacked elsewhere but his forces were harassed by some of Hugh's cavalry. While the king was stalled before the gate, a bald priest, the leader of a peasant militia which they bishops had ordered to support the king, climbed up the earthwork and chopped a hole in the palisade, opening the way to the king's men. Hugh fled into the motte and later surrendered.[57] The farcical elements in this story should not be allowed to detract from understanding how difficult it was to take even a simple fortification. In this case royal resources were augmented by the church, which had been plundered by Hugh, in what was a major undertaking. Le Puiset was unusually large, so Hugh could not guard its whole circuit, enabling the bald priest to do his work. His success also underlines the need for infantry in sieges.

Archery was vital to both sides in a siege. The attacker needed to keep the defenders' head down, so that the walls could be assaulted. Strong penthouses were often constructed and moved close to the walls to protect miners picking

56 J.Gillingham, *Richard I* (London: Yale, 2002), 81.

57 Suger of St Denis, *The Deeds of Louis the Fat* ed. R.C.Cusimano and J.Moorhead (Washington: Catholic University, 1992), 84-89.

at the foundations. Towers could be built to dominate a section of the walls with arrow fire, and, as at Jerusalem in 1099, they could be moved up to the wall on wheels and a drawbridge dropped.[58] Defenders needed to bring the maximum firepower to bear at the point of danger. Arrow-slits in the walls were of vital importance to defenders, especially as cut into projecting towers they could take any attack on the walls in the flank. Though it has to be said that shooting galleries with multiple slits were never safe places.[59] Such considerations partly explain the growing popularity of crossbows, a weapon with a flat trajectory which assisted accuracy, and used in conjunction with the plunging fire of ordinary bows must have been deadly.

Arrow fire had a very important impact on castle design in the crusader states. At first crusader castles were simple affairs, like the "Red Tower", a two-storey donjon surrounded by a square outer wall.[60] But as the settlers came under enemy pressure, mighty fortresses arose showing careful design. In 1168 the Hospitallers constructed Belvoir on the flat western edge of the Jordan valley, "set amidst the stars like an eagle's nest and abode of the moon." [61] A wide rock cut moat surrounds the massive square outer castle on three sides (the other is the cliff over overlooking the Jordan valley on which sat a great tower) each set with square towers. A precise small copy forms the inner castle. But the special conditions of siege in the Middle East was that wealthy hostile states could use archery on a scale unknown in the west.

Turkish horse archers was the staple of Middle Eastern armies, and the proximity of the steppe meant they could be hired in large numbers, to supplement local mounted and foot archers. Bowmen on this scale could saturate the defences and even arrow slits would become very hazardous: mighty Margat fell to the Mamluks in 1285: around the arrow slits, buried in the interstices of the building blocks the archaeologists found numerous arrowheads.[62] This is why at

58 J.France, *Victory in the East. A Military History of the First Crusade* (Cambridge: Cambridge University Press, 1994), 346-55.

59 P. Jones and D. Renn, "The military effectiveness of Arrow Loops: Some Experiments at White Castle," *Château Gaillard* 9-10 (1982), 445-56.

60 D.Pringle, *The Red Tower (al-Burj al-Ahmar)* (London: British School of Archaeology in Jerusalem, 1986).

61 Kennedy, *Crusader Castles*, 58-61.

62 Kennedy, *Crusader Castles*, 179.

Belvoir and other great crusader castles the outer walls are lined with buildings, like stores and stables, all having numerous loopholes.

Crac des Chevaliers in Syria illustrates the importance of missile weapons and their impact. The castle is built on a spur of the mountain accessible only from the south. Its highest point was sculpted to house the inner castle. On its south side a great talus and towers confronts the enemy, all providing ample cover for defenders. The outer wall on the south is lined by a huge stable with arrow slits. The west wall is immensely thick and set with shooting galleries and box machicolations - effectively small stone hoardings projecting from the walls covering blind spots. To the east is the main entrance, fully enclosed and provided amply with firing positions. On the south, between the outer and inner walls is a great cistern which, when filled, would be a deterrent to mining. In effect, the south outer wall and talus of the inner castle provide layers of firing points. At the very top are much wider opening for large crossbows which could be brought to bear on enemy catapults.

These heavier missile weapons were trebuchets, which by the thirteenth century were of two kinds, both relying on a rotating army with a sling attached. The traction trebuchet operated by human pulling power, could throw only relatively small missiles, but with a high rate of fire. It was clearly an anti-personnel weapon, though larger models could probably damage the crenulated wall protecting the walkway of a castle or city wall. Such weapons seem to have originated in China but were in use in Western Europe by the tenth century. The counterweight trebuchet, which appears simultaneously in Europe and the Middle East in the later twelfth century, threw a much heavier ball. Neither could reach beyond 150-200m, and it is noted that in operation usually had to be screened from their target's arrow fire. Neither could smash heavily built masonry walls, but both were major threats to fighting tops, and in the Middle East therefore increased dependence on concealed and well protected firing points.[63]

A rather more mundane means of attack was mining. In October 1215 King John besieged the great keep of Rochester castle, digging a mine under the tower at its south-east corner. Props were placed and a fire set, fuelled by "forty

63 I follow here M.S.Fulton, *Artillery in the Era of the Crusades. Siege Warfare and the Development of Trebuchet Technology* (Leiden: Brill, 2018).

of the fattest pigs of the sort least good for eating." The subsequent collapse enabled John to take the place.[64]Mining was highly developed in the Middle East.[65] In 1271 Baybars, Sultan of Egypt attacked Crac. His Mamluk regime in Egypt had developed a formidable standing army, far greater than anything that the weak kingdom of Jerusalem could field. Baybars quickly destroyed the lesser crusader castles which supported Crac and arrived before it on 3 March. He quickly overran the incomplete barbican in front of the south wall and placed his trebuchets there. A mine was dug under the south-west tower under cover of fire from these engines and bowmen. Once the tower collapsed, the garrison accepted terms and left the castle on 8 April.[66] It seems strange that so mighty a fortress fell so quickly, especially as it was held by the fighting monks of the Order of St John of whose bravery there can be no doubt. But Baybars' army was well equipped, and ready to pay the blood-price of the attack. And above all there was no chance of relief, and that really governed the fate of any fortification faced by a determined enemy.

Castles and city defences changed relatively little in the later Middle Ages, but states and armies did. The competence of governments was extended and deliberate strategic choices made about where to strengthen fortifications. In fact, lesser castles, while still useful in local warfare, were eclipsed. Armies became better organized and coherent. By the mid-thirteenth century gunpowder was known, and the first illustration of a gun is dated 1326. Guns were heavy and clumsy, of limited use in the field, but very valuable to both sides in a siege.[67] Henry V's conquest of Normandy, 1417-19, proceeded by a series of sieges in which cannon were vital. However, it should be noted that this happened at a time when French government was in disarray and incapable of

64 R.A. Brown, *Rochester Castle* (London: Her Majesty's Stationery Office, 1969), 14.

65 N. Prouteau, "Beneath the Battle? Miners and Engineers as 'Mercenaries in the Holy Land (xii-xiii siècles)," in J.France (ed.), *Mercenaries and Paid Men.The Mercenary Identity in the Middle Ages* (Leiden: Brill,2008),105-18.

66 Kennedy, *Crusader Castles*, 149-50.

67 C.J.Rogers, "The Military Revolutions of the Hundred Years War," *Journal of Military History* 57 (1993), 241-78 reproduced in C.J.Rogers (ed.), *The Military Revolution Debate* (Boulder: Westview,1995), 55-94.

mounting a challenge in the field.[68] Moreover, gunpowder artillery was a real challenge for contemporary ironworkers: Mons Meg now in Edinburgh castle weighs 15,366 pounds (6,970 kg) and is 13 feet (4.0 m) in length. Such weight made for great difficulties of movement. And gunpowder was very expensive. And just as castles used trebuchets against attackers, so cities and castles had their own cannons, and defensive devices. When the English threatened to besiege Orléans in October 1428 the French protected the bridge across the Loire with a *boulevart*, a strong point to keep the enemy away from the city. The English mined this but the French countermined; however this bulwark fell and the French retreated. The city was bombarded by English cannon, but the French had their own cannon, one of which fatally wounded the English commander, the earl of Salisbury. Thereafter the city was partially surrounded with a series of earthwork and timber forts. Ultimately the French, inspired by Joan of Arc were able to resupply the city and to force the abandonment of the siege.[69]

The fall of Constantinople in 1453 was the culmination of a superbly organized assault by the Ottoman Turks. On his accession the Ottoman Sultan, Mehmed II (1451-81) built fortresses and improved roads so that the city was isolated. An army of over 50,000 encamped before the city in April and it confronted about 8000 defenders who manned the immensely strong walls of the city. The Ottomans certainly used large guns, some of which survive to this day, but their eventual success on 29 May owed much more to the disciplined and well organized siege and the Sultan's acceptance of heavy casualties.[70]

Consequences

Many sieges failed, though rarely without loss to attackers and defenders. Many also ended in compromises of one kind or another. For what attacker did not prefer an intact city, the ransoms of its leaders and the domination of industrious citizens, to burning ruins and piles of profitless dead? On the First Crusade the crusaders in 1097 prepared a great assault on Nicaea, but under cover

68 J.Sumption, *Cursed Kings: The Hundred Years War 4* (London: Faber, 2015), 530-80.

69 K. DeVries*, Joan of Arc: a Military Leader* (Stroud: Sutton, 1999).

70 S. Runciman, *The Fall of Constantinople, 1453* (Cambridge: Cambridge University Press,1965).

of preparations their Byzantine allies secretly negotiated a peaceful surrender.[71] But the crusaders stormed Jerusalem in July 1099 after a savage siege, and as a result: "The city was filled with corpses and blood."[72] There were no formal laws of war in the Middle Ages. Nobles might ransom other nobles if fighting was not too bitter, but such consideration was rarely extended down the social scale. If a fortress was stormed all within were at the mercy of a wildly out of control soldiery. Commanders, therefore, had to make careful calculations. Too early a surrender and they would be dishonoured, too late and they risked being dead!

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72 Raymond of Aguilers, *Historia Francorum qui ceperunt Iherusalem* tr. A.C.Krey, The First Crusade (Gloucester Mass.: Smith, 1958), 261.

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© J. P. Morgan Library and Museum, MS M.638 fol 42r.
(Uriah Refuses to return home, Uriah is slain)

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(David orders the destruction of Sheba. Joab pursue Sheba in the city of Abel)

The Maritime Dimension in the Mediterranean Sieges of 16th Century

by Mark Stevens

Introduction

Some of the most advanced fortifications of their time were built on the islands and coasts of the Mediterranean during the 16th Century. These included works by the Knights of St John, the Venetians, Genoese and the Spanish. The Islands and coastal sites were all on the front line of the expansionist Otterman Empire and as a result were all potential targets for attack. These amphibious attacks, when they came, resulted in some of the epic sieges of the century, such as those of Rhodes, Corfu, Malta and Famagusta in the Eastern half of the Mediterranean. There were other sieges throughout the Mediterranean, such as at Algiers, Djerba, Tripoli, Tunis/Goletta, Bonifacio, Castel Nuovo, Nice, Nicosia, Kyrenia and The Peñon de Gomera, and they will be touched on, but this papers main focus will be on the four Eastern ones.[1]The fortresses that will be addressed in detail were not merely citadels with attached towns, but fully[2] fortified cities built around ports. In addition to the professional military who defended them, and these included the maritime personnel, their nonmilitary populations were also expected to play a key role in their defenses. But the critical element of their defence was their ability to be resupplied by sea, which added a significant maritime dimension to these sieges. The sieges of the four

1 Braudel, Fernand: *The Mediterranean and the Mediterranean World in the Reign of Philip II. Vol II.* (Trans by Sian Reynolds: Collins: 1973) Although first published in 1949 it still provides a superb overview of the sieges, maritime manoeuvres and political changes of the period.

2 The Fortifications of Rhodes, Corfu, Malta and Famagusta are still extant, and largely as they were during the various sieges. Duffy, Christopher. *Siege Warfare. The Fortress in the Early Modern World 1494-1660.* (Routledge. 1979). Chap 8, p191-199. Provides an overview on the development of fortifications in the Mediterranean during the 16th Century.

key fortresses have all been covered in some detail by various authors,[3] but the emphasis has tended to be on the land element of the sieges. The naval dimension has been acknowledged, but its central importance has tended to be understated. The aim of this paper is to focus on the maritime aspects of siege warfare in the Mediterranean in the 16th Century, and to highlight the relationship between fortifications, sieges and seapower. The period covered will be from 1517 to 1575. This period saw technological advances in ship building and design, fortress architecture and artillery development, as well as extensive political changes. Both Suleyman and Charles V possessed considerable naval assets, Venice was the only other power with a comparable navy. All of which came at a huge cost, which ultimately spelled the end of what has been described as "the apogee of galley warfare".[4] In the Mediterranean in the 16th century the amphibious and essentially short range nature of warfare at sea was highlighted, and the majority of operations were closely connected with attacks on, or in support of fortress ports, which were an essential corollary of galley warfare.[5]

The Siege of Rhodes – 1522. The Refortification of Rhodes

The fortress of Rhodes had been reconstructed and steadily enhanced and its fortifications had been totally transformed after the siege of 1480, and the earthquake that followed it. Although it did not possess the full 'trace Italian', it incorporated the new thinking and technological developments that had evolved in Italy during the wars between the French and the Holy Roman Empire, in response to developments in artillery design and usage. It had bastions pro-

3 For Rhodes: DeVries, Kelly and Douglas Smith, Robert. *Rhodes Besieged.* (The History Press. 2011): Davies, Jonathon: *The Sieges of Rhodes 1480-1522.* (Helion. 2024): Brockman, Eric: *The Two Sieges of Rhodes 14801522.* (London. 1969): For Corfu: Mallett, M.E. and Hale, J.R.: *The Military Organisation of a Renaissance State: Venice 1400-1617.* (Cambridge, 1984): Guilmartin, John Francis. *Gunpowder and Galleys. Changing Technology and Mediterranean Warfare at Sea in the 16th Century.* (Conway Maritime Press. 2003): Norwich, John Julius: *A History of Venice.* (Penguin. 1982): For Malta: Bradford, Ernle. *The Great Siege of Malta, 1565.* (Penguin. 1965): Bull, Marcus. *The Great Siege of Malta.* (Penguin. 2025): For Famagusta: Hill, George Francis. *A History of Cyprus, Vol III.* (Cambridge. 1948): Bicheno, Hugh. *The Crescent and the Cross.* (Castell. 2003).

4 Glete, Jan. *Warfare at Sea, 1500-1650. Maritime Conflicts and the Transformation of Europe.* (Routledge.2000). p.103-4.

5 Guilmartin. Op cite. p.111. Glete. Op cite. p. 95

jecting into a massively expanded ditch: large boulevards to move artillery around the walls: ‘ fausse brayes’, (small walls) in front of the main curtain walls: ‘tenailles’ in front of the most vulnerable walls(defensive works in the ditch between bastions); and the towers defending the military and commercial ports had been rebuilt as powerful artillery forts, which guarded the massive bronze chains across both harbours. The Grand Master Carretto(1513-21) had employed the Emperor Maximilian’s personal military engineer, Basilio Della di Vicenza, to create a new enciente in front of the old curtain walls and towers, and this had incorporated all of the latest techniques.[6] Crucially, the fortress made maximum use of artillery in its defence, and was well supplied with cannon, many given as gifts by various European rulers and nobles. It also had the ability to house its small fleet within its military harbour, and to repair its galleys within the city walls, through an enlarged gate adjoining the harbour. It was the perfect base for the conduct of raids, called “caravans” by the Hospitallers, and was also probably the most formidable fortified harbour in Europe at the time.

Preparing Rhodes for the Siege

The Hospitallers had a well developed intelligence gathering network, and controlled a number of the islands and fortresses to their west, such as at Kos and St Peter’s castle at Bodrum, which could give early warning of the arrival of any invasion force.[7] Suleyman had in any case sent a letter to the new Grand Master in September 1521, congratulating him on his appointment and effectively announcing his intentions to take over the Island.[8] He had been advised by both his army and naval commanders that Rhodes could be captured in between 15 and 30 days.So the Hospitallers used their fleet of galleys and round ships to bring in all but holding forces from their outposts. They also ordered victuals and munitions from Naples and the Romagna, and wine from Candia in Crete, controlled by the Venetians.

6 Brockman. Op cite. p.110. Davies. Op cite. p.82-86 and p.101. Oman, Charles. *A History of the Art of War in the XVI Century.* p.634/635. (Methuen.1937).

7 Davies. Op cite. p.41.

8 Brockman. Op cite.p.114.

The Venetians were 'neutral' [9]in the confrontation between the Hospitallers and the Sultan. As such they refused any assistance to the Hospitallers even though Crete was only 150 miles (240km) from Rhodes. Wine was an essential rather than a luxury in a period when water was often of dubious quality, especially when it had been collected in underground cisterns. Despite this, one of the Hospitaller's agents, Antonio Bosio, managed to extract fifteen shiploads of wine from Candia, in Crete, and enrolled mercenaries under the guise of wine-porters. He also managed to smuggle out to Rhodes the skilled siege engineer Gabriele Tadini da Martinengo, who was in the employment of the the Venetians at the time. He was to prove an invaluable asset to the defence of the town during the forthcoming siege.[10] Not all Venetians agreed with the policy of isolating Rhodes, and one Venetian ship merchant, Master Bonaldi, carrying 700 casks of wine, bound for Constantinople, voluntarily changed course and volunteered both his services and wine to the Hospitallers. The galleys of the Order also 'persuaded' a Genoese merchant carrying grain from Alexandria to Constantinople, to dock at Rhodes[11]. Swift galleys not only informed the Pope of their preparations, but also carried orders to the various Commanderies of the Order to come to their assistance with manpower and money. The fleet of the Hospitallers was therefore critical in preparing the city for the siege.

Meeting the Logistic Requirement of Rhodes

With a large force of soldiers and civilians to arm and feed for an extended period, being adequately supplied was fundamental to the survival of Rhodes. The forces within the city amounted to 500 Knights and Servants-at-Arms, 1000 mercenaries, and 500 Rhodian militia.[12] Additionally, some 50 Knights and gentlemen adventurers, and between one hundred and two hundred soldiers and sailors arrived during the siege. In addition there was a considerable civilian population, three thousand of whom left the Island with the Hospitallers at the end of the siege, mainly Latins and not Greeks, so the total number including

9 DeVries. Op cite. p.98-99.

10 Brockman. Op cite. p.123/4: DeVriese. Op cite. p.98. Davies. Op cite. p.176.

11 DeVries. Op cite. p.99

12 DeVries. Op cite. p.99. Davies. Op cite. p.174. [13] Brockman. Op cite. p.121.

the Greeks in the city probably approached 10,000 souls. This represented a formidable logistic challenge. However, the three Commissioners charged by the Grand Master with the control of victuals, weapons and ammunition, reported at the end of May 1522 that the fortress had sufficient stocks to last for a year.[13] Although their assessment was to prove optimistic, it highlights the effort that had gone into provisioning the city in the previous eight months. An effort that was due primarily to their highly efficient fleet, and demonstrated that the course of a siege, especially one that was anticipated, always had an important prelude before the main event. For island fortresses, access to an efficient and effective maritime force was crucial to survival.

The Ottoman Logistic Preparations

The Ottomans also had an immense logistic challenge to face. Suleyman and his efficient staff had begun their preparations for the siege in September 1521, as they returned from capturing Belgrade. Nothing was left to chance. Kelley de Vries and Robert Douglas Smith, in their excellent book on the two sieges of Rhodes, (Rhodes Besieged. 2011) provide estimates of the fleet size and number of Ottoman personnel that were involved in the siege. Although the Ottoman sources are limited they believe that the fleet consisted of 250 vessels at the start of the siege. These comprised 103 galleys, 70 smaller galleys, 35 galleases (large galleys), 35 'round' sailing ships called Mahonnes, as well as numerous smaller craft and 10 to 12 large ships which carried munitions and the great artillery.[13] The artillery train and its associated ammunition and equipment, took a great deal of time to load and space to carry. Jacques de Bourbon, a Hospitaller who was present and wrote an account of the siege described it as follows(quoted in Johnathan Davies, The Sieges of Rhodes. 2024): [14]

> " First there were 6 great guns cannon Perrier of brass(bronze) that shot a stone of three foot and a half. Also there were 15 pieces of iron that shot stones of 5 or 6 spans (12 inch diameter approx). Also there were 14 great bombards that shot stones of about 11 spans (32 in). Also there were 12 Basilisks….Also there were 15 double guns casting balls as Basilisks (same diameter). The mean (smaller) shot (guns) as sacres and passo-

13 DeVries. Op cite. p.95.

14 Davies. Op cite. p.180: DeVries. Op cite, p.100 – 103.

> valanti (falconets) were in great number…Also there were 12 pot guns (mortars) of brass that shot upwards".

In addition they itemise the immense amount of equipment, material and stores that were assembled, including 3,700 wicker baskets.[15]Similar numbers of men and artillery and their associated stores were required at all of the major siege operations during the period under consideration. The Ottoman fleet was initially used to transport stores and equipment, and the land element of the army, from Constantinople over the Bosporous to the Asian shore at Scutari. The land force departed two days ahead of the fleet on the 16 June 1522. The fleet itinerary was to sail initially to Gallipoli(250km), where Kortoglu joined them with more ships, then onto Chios(200km) and then to Marmaris(300km) before the final leg to Rhodes(55km), a total of 800km. Marmaris was a sheltered and sizeable bay north of Rhodes

Island and provided a good sheltered spot to embark the army.[16]The overland force marched 610km and rendezvoused with the fleet at Marmaris. The force that had been assembled to attack Rhodes was considerable, and included a force of miners and sappers[18]that were recruited from Bosnia and Wallachia. Again accurate estimates of the numbers involved are difficult, but eye witness accounts by Hospitallers talk of 165,000, including 15,000 sailors and 50,000 'labourers and miners'. The 'miners' were an essential element in the plan of attack on the fortress which did not rely on artillery alone. Although this figure is undoubtedly inflated, the Ottoman force was a huge one. The Sultan and his court, the Janissaries, the Sultan's Sipahi's, and the troops from Rumelia(European lands of the Ottomans), all had to be shipped across the Bosporus to the Asian shore before they began their march south. Troops from Anatolia joined the force en route. The fleet was eventually joined by an additional naval force from Syria, which meant that the total number of sails present during the early stages of the siege, numbered in the order of 400. On 26 June, the advance force of the fleet anchored at Kalithas Bay, 6 miles south west of Rhodes town, and began disembarking. The siege had begun.

15 DeVries. Op cite. p.96.

16 DeVries. Op cite. p.96/97. [18] Brockman. Op cite. p.123.

Laying Siege of Rhodes

From their bridgehead at Kalithas Bay the advance force began unloading its personnel and stores. As soon as a ship had disembarked its load it pulled away from the shore, and returned to Marmaris to pick up more men and equipment. This process went on continuously and without respite throughout July.[17]The Sultan and his court arrived at Marmaris on 28 July and were then also transported to Rhodes Island, were they landed with great fanfare. Because the Sultan and his court were present at the siege, a huge additional logistic effort was required to prepare for his arrival. He had for example a golden throne in his magnificent tent palace, which was set up some 4 mls from Rhodes town at Megasandra, while he established his battle headquarters on the hill of San Stefan, about a mile from the city walls.[18] By the time he arrived the artillery and all of the equipment and stores had been unloaded and was ready to be placed in position. So five busy weeks were required to get all of the equipment and personnel off the fleet and into position to start the siege. Although Rhodes was a relatively large Island, being 80km(50mls) long by 38km(25mls) wide, the Hospitallers had endeavored to harvest all of the crops, not entirely successfully according to one account, so by and large the Ottomans had to rely on what they had brought with them for their sustenance initially[19]. Although on a positive note the supply of water was not a significant problem as there were springs in the hills. Thereafter, the ships of the fleet would have been busy ensuring that adequate supplies continued to arrive from the mainland, which was visible from the Island. Keeping 165,000 men watered, fed and supplied throughout the hot summer months was essential to the smooth running of the siege, and the Ottoman fleet was essential to and fully engaged in achieving this.

Failure of the Ottoman Blockade of Rhodes

Throughout the course of the siege the Ottomans failed to impose an effective blockade of the port, and Hospitaller ships and smaller Rhodian fishing

17 Brockman. Op cite. p.125
18 Davies. Op cite. P.176
19 Brockman. Op cite. P.119

vessels were able to slip in and out of it.[20] However, due to the refusal of the Venetians to allow any aid to be sent to

Rhodes, and their obstruction of non Venetian vessels trying to sail to the Island, the Hospitallers had to rely on their accumulated stores of food, drink and munitions to survive the siege. At the end of August Antonio Bosio was sent to Naples and Fra Nicholas Hussey journeyed to Provence seeking reinforcements and supplies. On 24th August an English Knight, Brother Emeric Depreaux broke through the blockade with some supplies and a handful of knights.[21]Tragically, Fra Thomas Newport, another English Knight, had organised a well founded reinforcement from England, but it got no further than the Bay of Biscay, where storms caused the ship to founder, and all onboard were lost.[22] As the autumn weather set in, the possibility of a large scale relief force diminished, but despite the deteriorating weather small reinforcements arrived on the 14, 15,16 and 20th of October, bringing in Knights, gunners and sappers. By this stage of the siege however what were lacking were labourers and munitions.[23] Fra Nicholas Fairfax, had sailed for Candia on the 14th November to try and get more supplies, but had had difficulties with the Venetian authorities. He had eventually been allowed to leave on the pretext of sailing for Sicily, but once at sea he had seized the vessel, and arrived in Rhodes on 16th December with a cargo of wine and a few troops. The first wine in the city for two months.[24] It had not been the case during the siege of 1480, when ships kept the city resupplied throughout the summer. Despite this, the Hospitallers had also drawn on their own resources and on 9th November two brigantines carrying 12 knights and 100 men at arms, plus victuals, powder and shot, arrived from St Peter's at Bodrum. On the 15th November two barques arrived from the castle of Lindos, with munitions and 12 knights, and on the 16th November a galley sailed for Kos to pick up reinforcements from there.[25] The lateness of these efforts was probably due to the assumption, false as it turned out, that if the Ottomans had not succeeded by

20 Brockman. Op cite. P.131. DeVries. Op cite. P.108
21 Brockman. Op cite. P.130
22 Brockman. Op cite. p.136
23 Brockman. Op. cite. p.138
24 Brockman. Op cite. p.152
25 Brockman.Op cite. p.148

6th November, the end of the campaigning season, they would leave the Island, as they had done in 1480. The presence of Suleyman ensured that this did not happen, and Hospitaller chroniclers believed that this was the critical factor in the loss of Rhodes.[26]Suleyman could not afford to fail so early in his reign, and the proximity of the mainland to Rhodes made this a feasible decision.

The Sultan was furious at the inability of his fleet to mount an effective blockade, and after Depreaux had broken through he had ordered Kortoglu, who was effectively running the fleet, to be 'bastinadoed' on the quarterdeck of his galley. [27]This typically Turkish punishment involved being hung upside down, while the soles of your feet were whipped. Suleyman was not someone who tolerated failure. His army commander, Mehmet Pasha, was also condemned to death after the failure of a general attack in late September, although the Sultan was persuaded to relent by his commanders, who felt it would encourage the enemy. Despite the normal campaigning season lasting from the 21st of March to the 6th of November[28], the proximity of the mainland allowed this window to be extended. The fleet was able to shelter in Marmaris bay to avoid bad weather, but was close enough to make the short hop to Rhodes when required. Despite this, the fleet was in a poor state by the beginning of November and torrential rain made its situation worse. Sultan Suleyman, on only his second campaign since becoming Sultan, was not prepared to countenance defeat, and summoned additional troops, including Janissaries from the Persian border, to reinforce his forces.[29] These arrived at the end of October, as the reliability of the troops already on the Island was becoming suspect, due to their enormous casualties. The reinforcements were duly ferried over by the fleet to join the main force.

Surrender due to Lack of Maritime Relief

In early December the situation of the defenders had become critical, and a council of war discussed the situation. A report to the council by Gabriele

26 Davies. Op cite. p.198 and p.206
27 Brockman. Op cite. p.131. DeVries. Op cite. p.108.
28 Murphy, Rhodes. *Ottoman Warfare.* (UCL.1999)
29 Davies. Op cite. p.204

Martinendo proved decisive.[30] He reported that the supply of manpower had run out, and that there were not enough knights to man the walls, or able bodies available to move the artillery and repair the walls or to counter the numerous mines that had been dug. In addition they had virtually run out of gunpowder, as well as everything else. The Sultan, faced with spending an uncomfortable winter on the rain lashed Island and having already suffered enormous casualties, was prepared to offer generous terms, which after some delay were accepted by the Hospitallers and their Rhodian compatriots. A ceasefire took effect on the 24th December 1522.[31] The siege had lasted 6 months and the Emperor Charles, when told of the surrender, is reputed to have said "nothing in the World was ever so well lost".[32] However he had made no effort to support the Hospitallers, and arguably a significant relief force may have proved decisive. An indication of the Sultans desire to finish the siege was his offer to provide ships to take the Hospitallers and any who wished to accompany them from the island[33]. They were able to leave with the full honours of war, leaving only their heavy artillery behind. '3000 'Latin' inhabitants and a smaller number of Greeks departed with the remnants of the Hospitaller force. In the event they sailed in their own vessels, both round ships and galleys.

Round Ships and Galleys

When the Hospitallers eventually arrived at the port of Civita Vechia in 1523, they took delivery of a galleon, or large carrack, that had been under construction for them at Nice. It was called *The Santa Anna,* and was a huge vessel with armoured sides, both above and below the waterline. It had a crew of 300 and could accommodate 500 soldiers. It also had sufficient storage on board for water for 1000 men for six months and had its own bread ovens. It was probably the most powerful warship in Europe at the time, and was certainly the most

30 Brockman. Op cite. p.149/150. DeVries. Op cite. p.117.

31 Brockman. Op cite. pp. 149-153. Davies. Op cite. pp. 200-204. Both give detailed accounts of the lengthy negotiations that brought the siege to an end, and the role of the Rhodian population in the discussions.

32 Brockman. Op cite. p.155.

33 Brockman. Opcite. p.153.

powerful in the Mediterranean.[34]It remained in service with the Hospitallers until 1540, and was instrumental in the capture of Coron in 1532, and La Goletta in 1535, were its broadside devastated the walls of the castle[37]. Despite having the technology the chosen vessel of choice for warfare for the Hospitallers as well as the other combatants remained the galley. The sailing conditions in the Mediterranean made the use of galleons in warfare problematic, until technical developments improved their ship handling capability. Trying to co-ordinate a combined fleet of war galleys and round ships also proved extremely difficult, as the ideal operating conditions for both types of craft were diametrically opposed.[35] However, it would be wrong to think of amphibious warfare being an all galley affair. In all of the sieges of coastal and island fortress ports, carracks and other round ships proved an indispensable part of the fleet. This was largely due to their ability to carry large numbers of people, horses and stores, especially artillery.[36]Galleys always lacked space to carry anything over and above their normal fighting complement.

Coron (Koron), Morea (1531-3)

Although Hayreddin Barbarossa and his ever increasing force of Corsairs continued to enjoy success in the Western Mediterranean,[37] the main Ottoman fleet was not so fortunate. In 1531 a Hospitaller naval force had captured Coron(Koroni), in the Morea, and although compelled to withdraw, took 800 captives with it. The following year Charles V commissioned Andrea Doria to attack the Morea again, in an effort to relieve the Ottoman pressure on the border with Hungary.[38]Doria conducted a brilliant amphibious campaign which again captured Coron, as well as Paxos and the forts guarding the narrow entrance to the Gulf

34 Attard, Joseph. *The Knights of Malta.* p.9.(BDL Publishing. 1992). 37 Guilmartin. Op cite. p.68.

35 Guilmartin. Op cite. p. 278 and 280.

36 Guilmartin. Op cite. p. 62. Hale. Op cite. p.431.

37 Bradford, Ernle. *The Sultan's Admiral. Barbarossa – Pirate and Empire Builder.* Gives an accessible account of the extraordinary career of the Barbarossa brothers. (Hodder and Stoughton. 1969).

38 Bradford. Op cite. p. 117. There is no satisfactory biography of Andrea Doria in English, which is surprising given his importance to the maritime war. Useful information about his role can be found on the internet.

of Corinth. In both of the attacks, the Hospitallers carrack Santa Ana was used to great effect and Doria even rigged bridges from the mastheads of his carracks to storm the walls of the fortress. He then withdrew leaving a Spanish force to garrison Coron. Although it was besieged the following year, Doria returned and resupplied the garrison and then with a mixed force of carracks and galleys defeated the Ottoman fleet which was blockading it.[39] This effectively broke the siege, for although the port was in a coastal, rather than an island location, the main threat was still from the sea. Despite the success of the allied fleet, Charles V decided to evacuate the garrison. It was too far from the Spanish fleet bases in Sicily and Naples to be effectively supported and Doria organised the withdrawal without opposition, removing the whole garrison in five galleys. Doria's diversion succeeded in stalling Suleyman's offensive against the Hungarian border fortresses.[40] A rare example of a maritime effort impacting on a land campaign. It also highlighted the importance of distance in maritime warfare.

The Siege of Corfu – The Prelude – Franco-Ottoman Collaboration

The Sultan, having captured Baghdad and secured his eastern frontier, turned his attention once again to the west. He had come to a secret agreement with Francis 1 in late 1536 for a joint invasion of Italy. His agents had also bribed the governor of Brindisi to open the city gates to the Ottomans at the appropriate time[44]. The Sultan duly assembled his army and fleet at Constantinople and then marched his forces along the old Byzantine military road to Valona (modern Vlore, Albania) were he rendezvoused with the fleet. Valona is 70 mls (100kms) due north of Corfu on the Adriatic mainland, and had an important fortified harbour, which the Ottomans had taken in 1468. Suleyman began his campaign by getting Barbarossa to ship 8000 troops to Apulia under Lufti Pasha, but his plan to seize Brindisi were thwarted when the governors treachery was discovered just before the troops reached the city[41]. He therefore decided to capture Corfu, which served the Venetians as the perfect naval base at the shortest distance be-

39 Bradford. Op cite. p.117.

40 Bradford. Op cite. p. 117. [44] Bradford. Op cite. p.151.

41 Bradford. Op cite. p. 152. Guilmartin. Op cite. p. 59-60. Oman. Op cite. p.690 [46] Parker, Geoffrey. *Emperor. A New Life of Charles V*. p.258-9.(Yale.2019).

tween the Italian mainland and Rumelia (modern Albania). By late July it had also become apparent that Francis 1 had come to an agreement with Charles, and would not be invading northern Italy.[46] As a consolation prize Corfu offered many benefits to Suleyman, especially as the Venetians had broken their truce with him. It would allow the Ottomans to bottle up the Adriatic, and especially the Venetians and their fleet, and give them a jumping off post for any future invasions of Italy. Otranto, which had been captured and temporarily held in 1480, was only 95 mls (150km) away across the Straights of Otranto. Barbarossa was duly summoned back to Valona and began moving the

Sultan and his army the short distance to Corfu. A large force of soldiers, estimated at 25,000, and 38 artillery pieces, including a huge 50 pounder bombard, reputed to be the biggest in Europe, were transported down the coast and landed several miles from the city of Corfu.[42] The majority of the civilian population were withdrawn into the fortress. The island was thoroughly devastated while the Ottomans established their siege lines, and by the 18 August 1537 Suleyman was ready to begin the assault on the city.[43]

The Fortifications of Corfu

Following on from the loss of Modon and Coron to the Ottomans during the war of 1498-50, the Signoria in Venice had carried out a detailed study on its numerous fortified bases on the "empire del mare", which stretched from Zara in the northern Adriatic, to Famagusta in Cyprus. It concluded that very few were adequately fortified to meet the threat posed by modern artillery. After careful consideration, what Hugh Bicheno calls a ' cost benefit analysis' (Crescent and Cross. 2003), a small number of fortress ports were selected for the expensive task of upgrading, and Corfu was given high priority.[44] The other major ports were Zara, Candia(Crete): Kyrenia(Cyprus) and Famagusta (Cyprus). Nicosia was not added to the list until 1567. Work began on modernising Corfu in 1518, although funding was always a problem. Money was initially diverted from building projects on the 'terra firma', such as at Padua, Verona and Brescia.

42 Bradford. Op cite. p.152. Guilmartin. Op cite. p.279.

43 Bradford. Op cite. p. 152.

44 Hale. Op cite. p. 431.

Mallet and Hale in their comprehensive work on the defences of Venice (The Military Organisation of a Renaissance State. 1984) give a detailed account of the costs involved and the slow evolution of the defences.[45] Proveditors (inspectors) were appointed by the Venetian Senate to oversee the building work. One naval proveditor made simulated naval attacks on the island on which the fortified port was built, which revealed inadequate flanking fire at one point, and he pointed out that caves could be used as starting points for miners.[46] The Duke of Urbino, the commander of Venetian forces, made an inspection of the progress, as well as the the highly respected engineer, Michele Sanmicheli, who was sent in 1535 to report on the progress of the resident engineer, Augustine da Castello.[52] On the eve of the Turkish invasion, the local Corfiots were complaining that the programme had already led to the destruction of 2000 houses and was threatening more.[47] In addition to the building work, funding was also allocated for a proper garrison, which was 2000 strong, with funding for training, including the practice shooting of the artillery. In addition there were 2000 members of the Corfiots militia.[48]The money allocated included a permanent galley squadron which was to be based in the port. Corfu therefore presented a formidable obstacle for any attacker, and it was also within easy reach of a relief force from Venice.

The Siege of Corfu – 18 August to 6 September 1537

The siege began with a combined naval and land based artillery bombardment of the fortress. The Venetians had built a substantial moat which separated the fortress from the city of Corfu, and the Corfiots population had been evacuated from the city into it.[49]The land frontage facing the fortress was very limited, and powerfully defended by the most modern angled bastions. The naval force was therefore very important in the overall plan of attack. However, the fortifications stretched around the whole island on which the fortress port was built, and the forward firing guns of the galleys made little impact on the defence's.

45 Hale. Op cite. p. 432.
46 Hale. Op cite. p. 432. [52] Hale. Op cite. p.432.
47 Hale. Op cite. p.432.
48 Hale. Op cite. p.436-437.
49 Moat in front of fortress**

After a relatively short bombardment, the Ottomans made the first of their land assaults. This was bloodily repulsed, as were a further two attacks launched over the course of the following weeks.[50] In early September torrential rain hit the island, making the movement of artillery extremely difficult. It was also a contributory factor in an outbreak of dysentery amongst the attackers.[51] In the meantime a fleet under Doria had sailed from Sicily, having initially withdrawn from the area in the face of Barbarossa's fleet, which heavily outnumbered it. At the same time another relieving force had left from Venice. The two naval forces could have cut off the besieging force from its supply base at Valona, as well as potentially destroying the Ottoman fleet, which was essential for the evacuation of the force from Corfu island. So Suleyman decided to abandon the siege and withdraw his forces. His ships rapidly transported the army and its artillery back to Valona, from where it returned to Constantinople. He may also have been mindful of how long the defenders of Rhodes had held out and how vulnerable he was to being cut off and isolated. [52]In short the maritime elements of the siege were critical to its outcome. Although the siege of Corfu fortress was not as lengthy as the siege of Rhodes, or the later sieges of Malta and Famagusta, it's successful defence had immense strategic ramifications. It's capture would have effectively eliminated Venice as a maritime power, and would have placed a stranglehold at the exit to the Adriatic Sea not only to Venice but to the Italian ports of the eastern Italian littoral. Although Valona was only 70mls by sea (100kms) from Corfu it lacked its defences, and was not as important as a naval base. As such the siege deserves far more recognition than it has received from historians to date. As Guilmartin has written:

> "Whatever Suleyman's goals were, they were frustrated by Corfu's defenses. It was a major, if largely overlooked turning point in the struggle for control of the Mediterranean".[53]

It demonstrated that the art of fortification had advanced so much that sieges could not be embarked on unless the proper preparation and planning had been carried out.

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50 Norwich. Op cite. p. 452. Guilmartin. Op cite. p.60.

51 Norwich. Op cite. p.452.

52 Guilmartin. Op cite. p.60.

53 Guilmartin. Op cite. p.60.

The Siege of Castel Nuovo – August 1539 – Some Key Lessons

Barbarossa returned with his fleet the following year, and defeated a large allied force at Prevesa, although without doing them much damage. His force was then virtually destroyed in a storm, showing how susceptible to the weather galley fleets could be[54]. Andria Doria seized the opportunity this presented by taking the coastal fortress of Castel Nuovo, near the Venetian naval base at Cattaro (In modern Montenegro). However he refused to give to give it up to the Venetians, further adding to the mistrust the Venetians felt for Doria in particular and the Spanish in general.[55] A perennial problem was that the Venetians, the Spanish, the Pope and the Genoese, all had different strategic aims, which was a problem that was never resolved. A Spanish tercio of 4000 troops under Francisco Sarmiento de Mendoza was placed as a garrison in the castle, which lacked modern defences. Barbarossa had withdrawn to Constantinople to reform his fleet, for although the storm had wrecked 70 galleys, most of his crews had escaped. He reappeared in the Adriatic in 1539 with a powerful fleet of 200 ships and made straight for Castel Nuovo.[62] He had a force reported as 60,000 strong with him, although some of these troops had come by land. The Venetians, with no confidence in their allies and too weak to oppose the Ottomans independently, had sued for peace. This left the garrison without any prospect of relief from Venice, and Andrea Doria did not have sufficient strength to enter the Adriatic without them. Without any hope of relief by sea, Doria advised the Spanish Commander to surrender, a pragmatic and realistic view of the realities of maritime siege warfare. Surrounded and bombarded by both sea and land the garrison put up a heroic resistance, having refused point blank to surrender. When the commander offered his men the choice of surrender, they had yelled back " let them come". The fortress, although it did not have up to date defence's, was well stocked with victuals and munitions. The siege was a bloody affair, and Barbarossa lost many of his men, as many as 8000 according to some accounts. These included a large number of Janissaries. The siege lasted from 12 July to 7 August, and when the Ottomans finally broke into the town the few remaining defenders were all massacred. Although it was a testament to

54 Glete. Op cite. p.101.

55 Guilmartin. Op cite. p. 69. [62] Guilmartin. Op cite. p.69.

what well led and motivated troops could achieve, and their resistance became a legend at the time, it also highlighted that without the prospect of relief by sea they were doomed to defeat.[56]

The Siege of Malta. Prelude

The period 1560 – 64 saw the main Ottoman fleet largely restricted to the Aegean Sea for reasons that need not detain us here. Although the Corsairs remained active, they were also diverted by problems with Morocco. After the sack of Gozo by Dragut and the subsequent loss of Tripoli in 1551, the Hospitallers were finally able to focus their attention and their resources on the defence of Malta, and particularly on the enhancement of the fortifications of Birgu and Senglea. The attack on Gozo highlighted the need to built a fortress that could command the harbour of Marsamxett, where Dragut had initially landed in 1551.[57]The relatively simple star fortress was called St Elmo, and was built in only six months. This was a decision that would have a critical impact on the subsequent siege of the island. The old inland island capital of Mdina was also provided with improved defences. The Hospitallers were aided by Philip 11, who had replaced his father, Charles, who had died in 1559, as the King of Spain, Sicily and Naples. He lent them his senior fortress engineer to advise them on their efforts, and he recommended improvements to the design of St Elmo, including the addition of a Ravelin, as well as additional, modern fortifications on the land front at Birgu and Senglea. This included a new fort in Senglea, Fort St Michael, and further improvements to Fort St Angelo. Spanish troops were also sent to the island. Although by 1565 there were still further improvements to be made, the four fortified sites still presented a formidable challenge to any attacker. The small Hospitaller fleet of galleys and carracks was secured in the Dockyard Creek harbour, behind a huge chain across its mouth and under the guns of the fortress of St Angelo. Malta had a reasonable garrison of some 500 Hospitallers, plus a local militia of some 2000 Maltese, and a force

56 Oman. Op cite. p. 693.

57 Guilmartin, J.F. *Chap 6,* p.161-162 in Trim, D.J.B and Fissel, Mark Charles. *Amphibious Warfare 1000-1700.*
(Brill, 2006)

of 900 Spanish infantry, who arrived just before the Ottomans[58]. The Duke of Florence had also made a valuable contribution of 200 barrels of gunpowder to the defenders, which proved invaluable. Additional Italian infantry, numbering 800, and 200 various volunteers brought the overall strength of the garrison to over 6000, which included galley slaves. The various fortresses also had a large number of water cisterns, and the main source of water on the island at Marsa had been deliberately poisoned by the Hospitallers.[66] During the summer months the provision of water for the troops, and those labouring in the trenches, would be a serious consideration for the Ottoman commanders. One that would have to be resolved by using their fleet to collect water supplies.

The Siege of Malta – 1565 – The Strategic Decision to Take St Elmo

The Ottoman fleet finally emerged in full force on 22 March 1565 and travelled with remarkable speed arriving off of Malta on 18 May. Although there is always some doubt about the exact size of the Ottoman fleet, it appears to have included 193 vessels, including 131 galleys, 7 galleots, 4 galleases and 50 round ships which carried the artillery and stores. Marcus Bull, in his 2025 book, 'The Great Siege Of Malta' gives an excellent account of the various sources for the figures[59]. The destination of the fleet was not known until late in the day, and there was speculation that it was heading for La Goletta. Both the Grand Master, Jean de La Valette, and the viceroy of Sicily, Garcia de Toledo, were taken by surprise by how quickly the Ottoman had arrived[60]. The situation facing the Ottoman land and sea commanders was substantially different from many previous sieges. Malta was a comparatively small island which was bare of vegetation and natural water sources. A force that disembarked there would have to bring everything that it needed for the siege with it and would also need naval support from Tripoli and the Maghreb ports, for victuals, water and munitions. Malta was hot during the summer months and disease and exhaustion were a continual concern for the commanders. Piyale Pasha, the commander of the fleet, was insistent that the fleet had a secure anchorage for the duration of the siege. He

58 Guilmartin in Trim. Op cite. p.168. [66] Braudel. Op cite. p.839.

59 Bull. Op cite. p.132. Guilmartin. Op cite. p.198.

60 Guilmartin. Op cite. p.198.

had seen plenty of examples during his long sea service, of ships being wrecked by a adverse weather or being caught by hostile naval forces. Although his fleet initially anchored at Marsaxlokk harbour, on the southeastern edge of the island, this was over 6 mls(10klms) from Birgu and

Senglea. He wanted a harbour that was more sheltered, especially from the effects of the Scirrocco winds, and easily defendable, and was crucially nearer to the main centre of operations. The harbour he wanted was Marsamxett, which was overlooked by St Elmo fort. To use it St Elmo would need to be taken.[61]The land commander, Mustafa Pasha, also a very experienced soldier, wanted to take Mdina and then attack Senglea and Birgu, and ignore St Elmo. Piyale Pasha, won the argument, and Mustafa Pasha agreed to take St Elmo first.[62]

Possibly, he thought it would not hold out for long and was also cognisant of the fact that Suleyman had made his commanders promise to work harmoniously together. Essentially, the decision was made to conform to maritime requirements. As it turned out, with disastrous results.

The Two Maritime Reliefs of Malta – July and September 1565

The defenders of St Elmo held out from 27 May to the 23 June. They had inflicted huge casualties on the Ottomans, including nearly 3000 Janissaries. Dragut, who had arrived on the island when the siege was well underway, was also killed on the 18 June in front of St Elmo[63]. In early July, Garcia de Toledo was finally authorised by Philip II to send a small relief force to Malta. With great skill they avoided patrolling Ottoman galleys and landed the troops in the western part of the island. The force only numbered 600, but assisted by the garrison at Mdina, they managed to circumvent the Ottoman positions and entered Birgu.[72] Although not sufficient to alter the course of the siege, their arrival was a great morale booster to the defenders, and revived the defenders hopes that more substantial forces would arrive. Garcia had assembled in Sicily a force of 6000 troops and transports to carry them, but he could not get political clearance to release them from Philip. It was not until September that Don Alvaro de Barzan,

61 Guilmartin in Trim. Op cite. p.171. Guilmartin. Op cite. p.199 and N.16 p.207.

62 Bull. Op cite. p.137.

63 Bull. Op cite. p.13135-140. [72] Bull. Op cite. p.137.

the overall Spanish commander, was able to convince Philip and his council that the relief should go head.[64] On the island Mustafa Pasha was considering the possibility of remaining on the island over the winter, but a half hearted attempt to take Mdina was turned back and the idea was given up.[74]The weather had also deteriorated and stocks were running low. A Hospitaller chronicler of the siege, Francesco Guevara, estimated that 87,000 artillery shells had been fired at the defences.[65] The logistic requirement to provide the gunpowder and balls for this level of expenditure would have been enormous, and additional munitions as well as stores could only have been supplied from the North African ports. Indeed several vessels, including a large Ragusan carrack, had been intercepted taking victuals to supply the Ottomans[66]. By the time the second relief force arrived on 7 September, Mustapha had already decided to reembark his artillery. [i67]On learning that the relief force had arrived he also moved his army to Saint Paul's Bay to oppose them. The siege was lifted but the Ottomans still outnumbered the relief force, and they formed up for battle. However, the Napoleonic dictum that 'morale is the most important factor in warfare' came into play, and the demoralised and exhausted Ottoman forces were driven back to their boats, although the Janissaries provided a rearguard to cover the fleeing troops. The fleet returned to Constantinople having suffered a harsh defeat. Seapower had resulted in a rare triumph for the Spanish and their allies.

The Ottoman Invasion on Cyprus – 1570 – Loss of Kyrenia

Following their failure at Malta, the Ottomans also suffered the loss of their sultan, who died besieging Szigetvar, on the Hungarian border, on 5th September 1566. His successor, Selim II was anxious to start his rein with a significant military success and decided on the conquest of Cyprus. Cyprus was a big and fertile island, and the Venetians had spent a great deal of time and money on fortifying it. In 1567 they decided to rebuild the defences of the inland capital, at Nicosia. In a commendably short period the capital was provided with a circular

64 Bull. Op cite. p.176/177 [74] Bull. Op cite. p.172

65 Bull. Op cite. p. 187.

66 Bull. Op cite. p.188.

67 Bull. Op cite. p.176 and 184. Guilmartin in Trim. Op cite. p.177. Oman.Op cite. p.715. Braudel gives a slightly more nuanced account. Op cite. p.1019.

encient of 3 mls(5kms), with eleven angled bastions.[68]The circuit was initially made using packed earth, which was later faced with masonry. The earth tended to absorb the impact of artillery fire better than solid masonry walls. It represented the very latest in fortress defences. What it lacked was effective leadership. The Ottoman fleet, under Piyale Pasha had landed on the south coast, near Larnaca. However, the Venetians decided not to oppose the disembarkation or their march on the capital, in order to conserve their limited manpower. It was hoped and expected that relief would be sent by sea. The city was well stocked and possessed some capable commanders, but the overall leader, Niccolo Dandola lacked the will, courage and ability to effectively direct the defence, and the Ottomans duly stormed it on 9 September after a siege of 46 days.[69] To hasten the subjugation of the island, the head of Dandola was chopped off and sent to the garrison of Kyrenia, on the north coast, with a demand for their surrender. Kyrenia, unlike Nicosia, was a fortress port, and it had powerful modernised artillery defences which are still extant today. The Venetian Senate expected it to hold out and await relief by sea. However, it's Commander, Zuanmaria Mudazzo chose to surrender, and departed the island with his garrison. On his return to Venice, he faced a court martial and spent the rest of his life in prison. [70]The Signoria expected its soldiers to hold their positions, especially when the possibility of relief was available to them. And a relief attempt had been made. A combined fleet, which included Spain and its allies, the Popes contribution, and the Venetian fleet, had left Crete en route for Cyprus.[71]However, it had been delayed in assembling at Crete. At Zara, in the northern Adriatic, disease had broken out in the Venetian fleet, and both its rowers and soldiers were decimated.[72] The Spanish also prevaricated due to their primary interest being in North Africa, and Giovanni Andre Doria, the nephew of Andria Doria, was intent on keeping his fleet intact. There was considerable mutual distrust between the allies. The Ottomans were aware of the risk of relief, and Piyale Pasha had assembled a strong force to oppose it. A fleet had been stationed in Rhodes during

68 Duffy. Op cite. p.196/7. Bicheno. Op cite. p.188.

69 Bicheno. Op cite. p.188 and 190. Duffy. Op cite. p.196.

70 Black, Jeremy. *Fortifications and Siegecraft. Defence and Attack Through the Ages.* p.81. (Rowland and Littlefield. 2018).

71 Hale. Op cite. P. 234-236.

72 Bicheno. Op cite. p.187 and 193.

the Ottoman invasion to guard its flank.[73]The allied fleet set sail in considerable force and headed for Cyprus. When the news of Nicosia's capture reached them, the decision was made to turned back to Crete. As it was late in the season the fleets then returned to their respective ports. Zante, the Venetian commander, was arrested and imprisoned on his return to Venice, perhaps unjustly, for failure of the attempt.

The Ottoman Siege of Famagusta and Querini's Relief

Famagusta, unlike Nicosia, had effective and determined commanders, Marcantonio Bragadin and Astorre Baglione.[74]Also the Cypriot civilians within the city walls, took an active part in the defence. The Cypriot population was not generally in favour of the Venetians, due to the difference in faiths, Catholic as opposed to Orthodox, and their financial extractions. It is a measure of the maritime nature of the city that the population was generally supportive.

They had a stake in the management of the port and were integral to its efficient running.

This made a big difference to an effective defence, as the experiences of Rhodes, Corfu and Malta all showed. Also the fortifications of the city had been continuously improved over a number of years, and were formidable despite their 3 km length[75].Although Famagusta was on the east coast of Cyprus, the very size of the island meant that it was extremely difficult to maintain an effective blockade, and the sea conditions favoured ships sailing from the west. The Venetian Senate expected that effective relief for city would come from Crete, while they worked tirelessly to recreate another allied fleet, which they eventually succeeded in doing. The expectation was that the fleet of the Holy League, as it came to be called, would provide sufficient force to rescue the situation. The Venetian naval commander in Crete, Marc Querini, and his brother, was fully aware of the plans and expectations. He organised a number of resupply fleets which forced their way into the besieged harbour, and after a particularly spectacular effort on the 1 January 1571, where he landed 1500 reinforcements,

73 Bicheno.Op cite. p.188.

74 Bicheno. Op cite. p.190.

75 Bicheno. Op cite. p.191-192.

Piyali Pasha was removed from his post with the Ottoman fleet.[76] Layla Mustapha Pasha was left in sole command of the operation. He had moved his army the 50mls(75kms) from Nicosia and also moved his 145 pieces of artillery and all their associated stores. This was a time-consuming business, but his Sipahi cavalry kept the defenders behind their walls while it took place. He then began a slow process of constructing a massive system of trenches around the walls, which were deep enough that his troops could move around completely hidden from view from the city walls. He also constructed 10 forts of timber and cotton bales which protected his gun positions. He did not attempt a rushed attack but planned methodically and awaited the arrival of spring while conserving his force from disease. Reinforcements also arrived from Constantinople in the spring. When he began the attack in earnest, he was fully prepared and supplied.

The Surrender of Famagusta

The assault on the city began in earnest on the 12 May and lasted until the very end of July. The 145 artillery pieces opened a massive barrage which they endeavoured to maintain throughout the months of May, June and July. The defenders, who numbered some 8,500 troops, with some 90 artillery pieces, put up a formidable resistance, and despite the careful preparations of the Ottomans, they suffered huge casualties[77]. The intensity of the fighting meant that the expenditure of ammunition and gunpowder was prodigious on both sides, but the defenders had to rely on external resupply, whereas the Ottoman forces had built up their stocks during the winter months. The Ottoman launched 5 major assaults, and in late July managed to breach the defences and reached the citadel, overlooking the military harbour. Although they were ejected, the attacks in late July caused heavy casualties amongst the defenders. At the end of the siege only 800 were still alive.[78] Bragadin had been forced to expel all of the 'useless' mouths as food began to run critically short, and the Cypriots were pleading with him to agree terms. On 1 August 1571, with munitions and food supplies both critical, he agreed. The Ottomans had suffered massively,

76 Bicheno. Op cite. p.204. Duffy. Op cite. p.196. Oman. Op cite. p.729.

77 Oman.Op cite. p.729. Black. Op cite. p.82.

78 Bicheno. Op cite. p.207.

with some sources placing their casualties as high as 50,000. The Ottomans had still not successfully breached the defences, so under the laws of war as understood at the time, the defenders should have been granted generous terms. So Bragadin decision made sense and he was offered good terms. But why had no relief arrived from the Venetians. Their efforts had been diverted by the need to support the huge fleet of 200 galleys that the Holy League were assembling. As in 1570, the fleet was slow to assemble, [79]and when it eventually appeared in the Adriatic, it was too late to be of assistance to the fortress. A delegation of the senior commanders of Famagusta presented themselves to Layla Mustapha Pasha to hand over the keys of the fortress. He initially received them cordially, but his mood changed and for one of the only times in Ottoman history, they went back on their word. All of the commanders were beheaded and Bragadin was humiliated and tortured to death[80]. His stout defence had however allowed the Holy League fleet time to assemble and confront the Ottoman fleet. Their subsequent massive victory at Lepanto in October, was vindication of his efforts, and the Venetian sailors and soldiers, having learnt of his fate, are reported to have fought with particular ferocity during the battle.

Conclusion

Siege Warfare in the Mediterranean tended to revolve around the attack and defence of the numerous fortified ports that abounded around the coastline of the sea. Maritime support was an essential element of all these sieges. Maritime warfare was essentially amphibious in nature and the massive clash at Lepanto was something of an aberration. All the various sieges had a prelude which was entirely dependent on the maritime capability, capacity and competence of the attackers. Preparing for a major siege operation took a huge logistical effort which only the major powers were capable of mustering. It was also incredibly expensive, typically taking the entire value of the annual silver shipment from South America to fund the major Spanish effort against Tunis for example.[81]The campaigning season was also limited by climatic conditions, and typically was

79 Bicheno. Op cite. p. 198/199.

80 Bicheno. Op cite. p. 207/208.

81 Hale. Op cite. p. 240/241. Braudel. Op cite. p.841. and n.15.

from 31 March to 6 November. Efforts to operate outside these time parameters could, and frequently did, result in disaster. The weather was a major factor in all maritime planning and frequently disrupted the best laid plans.[82] Fortified ports, even ones that had been modernized, all relied on external maritime relief to sustain them and to relieve them. Relief by sea was fundamental to the successful defence of all fortified ports.

As a result besieging forces had to maintain a naval guard, both to intercept relief attempts and to ensure their means of withdrawal was secure. Successful relief also required a high degree of competence from commanders. During the 16th Century there were a plethora of gifted maritime commanders on all sides, as well as courageous and determined fortress defenders. Advances in fortification design and improvement in artillery meant that proper preparation to tackle fortress ports was essential. This made the planning and execution of sieges against fortified ports a major, and always risky operation, which was fundamentally reliant on its maritime element for success.

82 There are numerous examples of the impact of weather on operations on both sides: Algiers in 1517 and 1519: the destruction of Barbarossa's fleet after Prevesa: the torrential rain that disrupted the siege of Corfu in 1534: the storm that wrecked Charles V fleet at Algiers in 1541, and many more beside.

Giovanni Francesco Camocio (1501-1575). Isole famose porti, fortezze, e terre maritime sottoposte alla Ser.ma Sig.ria di Venetia, ad altri Principi Christiani, et al Sig. or Turco, Venice, alla libraria del segno di S.Marco (1574). Wikimedia Commons

"Downstream Operations": Fortresses and the Strategy of the Habsburg Emperors in the mid-17th century

by Lothar Höbelt

I. The Thirty Years' War

In the early modern period, fortresses and siegecraft clearly dominated warfare in the fairly compact theatre of the Netherlands, from the days of Spinola and Maurice of Nassau to Vauban and Coehoorn. Battles were almost inevitably fought over attempts to come to the relief of besieged fortresses. Thionville in 1639, Rocroi in 1643, Arras in 1654, Valenciennes in 1656 and the Battle of the Dunes in 1658 (fought for the relief of Dunkirk) might all serve as examples.

However, for the Thirty Years' War as a "Teutonic War" we find comparatively few examples of campaigns that centred on sieges: Breisach (1638) and Wolfenbüttel (1641) are almost the only ones.[1] True, most German towns sheltered behind certain kinds of mostly outmoded fortifications. But few were able – or willing - to resist an energetic attack by forces bigger than mere raiding parties. Town commanders and/or civil authorities faced the dilemma of having to choose the lesser evil, either an early surrender with all the ensuing heavy financial obligations versus a last-ditch stand that invited the risk of being taken by storm, leading to plunder and almost total annihilation, with Magdeburg in 1631 serving as the best – or worst – example. Resistance seemed a worthwhile option only if the invader showed up towards the very end of the fighting season, say in September or October and defenders could count on the onset of winter to deliver them from evil (Göttingen in 1625 relied on this seasonal form

1 The second battle of Breitenfeld in November 1642 was fought after the Swedes had already lifted the siege of Leipzig.

of divine assistance).[2]

In the first half of the Thirty Years' War, there were only two celebrated long-term sieges: Stralsund and Casale – both of them significantly located in a sort of political no man's land. Stralsund - the one German community that resisted Wallenstein in 1628 - was a dissident Pomeranian town that had rejected the deal its duke had concluded with Wallenstein, relied on its maritime connections and was supported by Danish and Swedish outside forces.[3] Casale di Monferrato, on the upper reaches of the Po river, was part of the disputed heritage of the extinct Gonzaga line of Mantua,[4] with Savoy, Spain, France and the Emperor taking turns in the military and political manoeuvres. Part of its fame was that the Papal diplomat who prevented the impending battle between the besieging Spanish and the French coming to its relief from taking place in October 1630, was none other than the young Giulio Mazzarino.

Sieges followed Spinola's counsel: "Cerrar la puerta y abrir la mano" (Close the port and open your hand), i.e. starve and/or bribe the defenders. Breisach was starved into submission after no less than nine months in 1638 (with the usual horror stories of rats and kids being eaten).[5] The siege of Wolfenbüttel in 1641 was an interesting variation on a common theme: Often attackers would divert streams to drain the moat. In this case the besiegers built a dam to flood the fortifications. They almost succeeded before an army of relief appeared just in time, lost the battle but still succeeded in driving off the attackers. The Emperor's brother, Archduke Leopold Wilhelm, who inspected the siege-works, wondered how the besiegers, surrounded by stagnant water, had been able to stand the attacks - not by his men but by the thick swarms of mosquitoes.[6]

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2 Lothar Höbelt, Surrender during the Thirty Years War. In: Holger Afflerbach & Hew Strachan (Eds.), How Fighting ends. A History of Surrender (Oxford 2012), pp. 141-151.

3 The most readable account in Golo Mann, Wallenstein (Frankfurt 1971), pp. 458-477.

4 David Parrott, The Mantuan Succession, 1627-31. A Sovereignty Dispute in Early Modern Europe, in: *English Historical Review* 112 (1997), pp. 20-65; Romolo Quazza, Il periodo Italiano della guerra dei trent'anni, in: *Rivista Storica Italiana* 50 (1933), pp. 64-89.

5 Heinrich Leander von Wetzer, Der Feldzug am Ober-Rhein und die Belagerung von Breisach, in: Mittheilungen des k.k. Kriegsarchivs, Neue Folge 1 (1887), pp. 225-344; 2 (1888), pp. 257-378; 3 (1889),pp. 1-154.

6 Biblioteca Apostolica Vaticana, Barb. Lat. 7021, avvisi 29 Nov. 1641; Lothar Höbelt, Von Nördlingen bis Jankau. Kaiserliche Strategie und Kriegführung 1634-1645 (Vienna 2016), p. 288.

In the absence of powerful siege trains, the activity of both sides tended to focus on tunnelling, blowing up mines or building countermines. Vauban would advertise his labour-intensive way of conquering fortresses as life-savers. But this back-breaking work was beneath the dignity of mercenaries, let alone the proud cavalrymen who increasingly made up the bulk of the armies. They contemptuously referred to "foxes, moles and ground squirrels". Even the Aulic War Council in Vienna reluctantly agreed that soldiers could not be forced to do so, without offering extra incentives.[7] In the absence of a corps of sappers, Imperial armies tried to recruit specialists ad hoc from mining centres, such as the Saxon Freiberg or the Hungarian *Bergstädte*.[8]

Apart from Westphalia – the valleys of the Ruhr and the Lippe - that formed part of the "high-tech" Netherlands theatre of war, most of the Thirty Years War in the rest of the Empire was conducted by highly mobile armies that managed to cover huge distances in a few weeks. The Swedes in particular conducted lightning raids that did not conform to any great strategic design but were primarily concerned with securing suitable billets for the customary respite in winter. Vauban's system relied on meticulous planning and perfect logistics. Neither was forthcoming in the duel between Swedes and the Emperor in the depth of Germany. Heavy artillery could rarely keep up with the movements of the armies. The standard siege gun, the "half-cannon", weighed two tons and needed at least twenty horses to be moved over the bad roads of the time.[9] Imperial artillery depots were located far away in either Vienna or Krumau/Cesky Krumlov (on the headwaters of the Vltava that fed into the Elbe). Every now and then local allies (e.g. Saxony) might supply artillery from their reserves.

In some cases, towns were taken by a general storm designed to overwhelm the defenders by attacking from all sides at the same time. Torstensson's taking of Glogau in 1642 was an outstanding examples of this tactic. Significantly,

7 Kriegsarchiv Wien (KA), Hofkriegsrats-Registratur (HKR-Reg.) 6 Dec. 1660; Berthold Bretholz, Der Vertheidigungskampf der Stadt Brünn gegen die Schweden 1645 (Brünn 1895), p. 57.

8 KA, HKR-Reg. 16 June 1659.

9 Those are the figures given in KA, Alte Feldakten (AFA) 111/XI/126; Christopher Duffy, Siege Warfare. The Fortress in the Early Modern World 1494-1660 (London 1979), p. 96; Franz Felberbauer, Die Kanonen der Fürsten Esterhazy auf Burg Forchtenstein (Eisenstadt 2018), pp. 117-122.

when the tide turned and the Imperial army arrived in front of Glogau a few months later, Ottavio Piccolomini – the general who had served in the Netherlands – wanted to start a regular siege, but Leopold Wilhelm demurred. When Conde sailed down the Rhine in the late summer of 1644, the ten heavy guns he carried with him, persuaded the garrisons of Philippsburg and Mayence to choose the better part of valour.[10] This bloodless French conquest of the Rhine was of prime strategic importance as it threatened to severe the links between the Emperor and the Spanish Netherlands. In terms of political impact, it was overshadowed by Königsmarck's coup de main against the Lesser Town of Prague in 1648, that was instrumental in forcing the Emperor to sign the peace of Westphalia.[11]

The fortresses that mattered did not form part of a *ceinture de fer*, a strategic line of defence, but were primarily intended as safe places for magazines, convenient retreats and springboards for raiding parties. Fortified towns were used as headquarters of occupation forces. As such they were supposed to ensure the raising of contributions from the surrounding countryside, while denying those benefits to the enemy. Classic examples were Olmütz/Olomouc in Moravia or Erfurt in Thuringia for the Swedes; or the eagle's nest of the Hohentwiel, not far from Lake Constance, for a maverick Württemberg colonel. However, their role was massively enhanced once they were located on one of the great navigable rivers, Rhine, Weser, Elbe or Oder. In that case, they either served as bridgeheads to enable armies to cross rivers (or even worse the swampy ground surrounding rivers); and as barriers to deny the enemy the use of the river as a means of transporting supplies and artillery.

Ratisbon and Breisach were exceptional because they possessed bridges, as did Magdeburg on the Elbe and Minden on the Weser. Lower down the river, armies had to rely on what might be called pre-pontoon bridges (*Schiffsbrücken*).

10 Höbelt, Nördlingen bis Jankau, pp. 139-40, 324, 334, 365, 399.

11 Jan Kilian, Der Kampf um Prag, in: Robert Rebitsch, Jenny Öhman, Jan Kilian (Eds.), 1648. Kriegführung und Friedensverhandlungen. Prag und das Ende des Dreißigjährigen Krieges (Innsbruck 2018), pp. 179-294; Claudia Reichl-Ham, Jan Kilian & Jenny Öhman (Eds.), „15 Wochen lang bey Tag und Nacht von denen Schweden belägert". Das Tagebuch des Johann Norbert Zatocil von Löwenbruck zur Belagerung von Prag durch die Schweden im Jahr 1648 (Vienna 2022); Lothar Höbelt, Ferdinand III. Friedenskaiser wider Willen (Graz 2008), pp. 282-290.

Towns were still very helpful in that respect as the fortified banks of the river facilitated movement across enormously. Of course, pre-fabricated pontoons there were none. What you needed was a great number of boats of roughly equal size. If the boats could not be fitted together properly, soldiers might still be able to cross in single file, but wagons could not.[12] Once an army had crossed the river, it would often march off in a direction where the boats could not follow. Thus, it was not always easy to find a secure refuge for the bridging material, especially when the crossing had taken place in more or less open country. In at least one case, Imperial high command actually started an inquiry where the ships used some years ago had vanished in the meantime.[13]

The one artery that was crucial to the success of Wallenstein was the Elbe river that allowed him to ship supplies from his own Bohemian estates down-river almost directly to his armies operating in the North of Germany. Successful operations in the northern half of the Empire could always be based on "downstream operations". Once the countryside in the North had been thoroughly devastated by the war, the importance of the Elbe probably even increased after Wallenstein's death in 1634. Imperial lines of communications were guarded by Saxony that held on to Magdeburg from 1636 to 1646, quite apart from Dresden, Torgau (lost to Baner for a few months in 1637) and Wittenberg. At the mouth of the river, the Hanseatic port of Hamburg was sometimes threatened by Danish or Imperial armies, but managed to preserve its autonomy throughout the war years. In between Hamburg and Magdeburg, Gustavus Adolphus had built a fortified camp, the *Werberschanze*, opposite the confluence of Elbe and Havel; but it took the Swedes until 1643 before they had eliminated Dömitz, a Mecklenburg fortress held by an enterprising Imperial colonel who charged exorbitant tolls from passing ships.

Further East, the Swedes had held on to Stettin at the mouth of the Oder ever since Gustavus Adolphus first landing in the summer of 1630. In 1637 the Imperial armies almost managed to cut off the Swedes by occupying the islands controlling the estuary, Usedom and Wollin. But after desaster overtook the Imperial army during the winter of 1638/39 (when ice blocked the Elbe) the Swedes

12 Höbelt, Nördlingen bis Jankau, p. 285.

13 Ibid., p. 380.

forced Brandenburg to grant them a right to use the river. Their surprise attack on Glogau, the gateway to Silesia, in 1642 heralded the turning point of the War. Silesia provided a corridor for enemies following the Oder river to circumvent Bohemia and launch attacks against Vienna – or link up with allies from Hungary, as both Mansfeld in 1626 and Torstensson in 1642 tried to do. Silesia was no centrally administered province but consisted of a number of principalities who ranked slightly below the estates of the Empire but enjoyed a large measure of autonomy. This political background was reflected in a disproportionately high number of fortified capitals that changed hands several times during the 1640s: Most of them were conquered by the Imperial side in 1641, lost again in 1642, reconquered in 1644 (when Sweden preferred to fight her Danish rivals) and succumbed again in 1645.

Breisach – incidentally, a fortress that Vauban considered overrated - and the Rhine are usually associated with the "Spanish Road" that had long since lost its importance (as trouble in both Savoy and the Valtellina no longer allowed free passage for Spanish armies from Italy into Germany). Gustavus Adolphus took Mayence in 1631; even worse, his appearance prompted all the Rhenish Catholics, foremost among them the Elector of Treves, to take refuge with the French who promised to protect them from their heretic allies. The Habsburg difficulties were compounded by the special position of the town of Strasbourg that – like Hamburg – insisted on its neutrality and denied the imperial armies the use of its bridge. [14] But in 1636/37 the Habsburgs managed to reconquer the crucial Rhine fortresses of Philippsburg,[15] Mayence and Ehrenbreitstein; they could always rely on Bonn and Cologne, even if the Dutch garrisoned Wesel lower down the river. Communications between the Emperor and the Spanish Netherlands were not seriously threatened between 1634 and 1644.

However, the Weser river continued to block communications between the Habsburg armies operating in the Rhineland and the Imperial forces operating along the Elbe. The Weser river in Lower Saxony was guarded by a num-

14 For Vauban's opinions see Anne Blanchard, Vauban (Paris 1996), p. 358.

15 The margrave of Baden once sighed that if only his cousin, the ruling prince of Baden, was wiling to sacrifice a few villages, one could manage to cut off the fortress from the river. Haus-, Hof- und Staatsarchiv Wien (HHStA), manuscript W 824, Esaias Pufendorf diary, fol. 194 (11 Jan. 1672).

ber of minor fortresses such as Nienburg, Minden or Hameln. Duke George of Braunschweig-Lüneburg – the grandfather of King George I of Great Britain – managed to get hold of them in 1633-35, just before the position of his Swedish allies collapsed after the battle of Nördlingen. He made his peace with the Emperor in 1635, lost Nienburg and Minden to the Swedes the next year but retained and strengthened Hameln. George did not allow any of the warring armies to cross his territories. He thus laid the groundwork for the treaty of Goslar (signed in 1642, a few months after his death) when the House of Hanover gained the privilege of being officially allowed to withdraw into neutrality.[16] When the Habsburgs wanted to send reinforcements from the Rhineland to the East, as they did in 1636, 1639 or 1641, they had to include a long detour to the South. At the very least, they managed to conquer Höxter further up the river in October 1640.[17]

Siege I: Brünn 1645

Strangely enough, the one siege of the Thirty Years' War that has always been remembered fondly by the Habsburgs, did not concern one of those crucial river-crossings or barriers, but the Moravian capital of Brünn/Brno that in 1645 was successfully defended against the Swedes by one of their renegade colonels, Louis Raduit de Souches, a Huguenot from La Rochelle. To some extent, Brünn can count as a turning point of sorts: After lifting the siege, Torstensson who had lead the Swedes to the gates of Vienna, soon moved back to the North of Germany. On one level, the months spent in front of Brünn counted as opportunity costs. They allowed Ferdinand III to assemble reserves and rebuild his field army after the disasters of the winter 1644/45. On the other hand, as Torstensson was unable to cross the Danube, there was nothing much he could do – except wait for his mercurial Transylvanian allies coming to the rescue and rolling up the Imperial position along the Danube from the East.

György I. Rakoczi, the Prince of Transylvania, was certainly willing to make

16 Wilhelm Langenbeck, Die Politik des Hauses Braunschweig-Lüneburg in den Jahren 1640 und 1641 (Hannover 1904); Michael Reimann, Der Friede von Goslar 1642 (Hildesheim 1979).

17 Höbelt, Jankau bis Nördlingen, pp. 98, 266.

the most of this opportunity to act as an arbiter of the Empire's fate. But he was hamstrung by the opposition of his Ottoman overlords who had just started the Candian war against Venice and did not want to add the Emperor to the list of her enemies. The coordination between the Swedes and the Transylvanians had never worked smoothly. Rakoczi had challenged the Emperor in the winter of 1643/44 just as – unbeknown to him – the Swedes were leaving Moravia and started their surprise attack against Denmark. Now that Torstensson had returned – and Ottoman orders to desist had become more insistent - Rakoczi let himself be courted by both sides but in the end came to an agreement with the Habsburgs that left him in possession of most of Upper Hungary.[18]

Brünn is a good example to highlight the hybrid character of warfare during the "Teutonic War". The town boasted of three bastions (but they were tiny); the attackers (incidentally led by another Huguenot, Kaspar de Mortaigne) dug "approaches" (but the map does not show any of the characteristic zig-zag of a more sophisticated age). It was only after dragoons had successfully managed to carry much needed supplies of black powder into the town on horseback that the besiegers thought about completing their lines of circumvallation to stop such raids. The siege lasted for more than three months, from the beginning of May till mid-August. The garrison launched several successful sorties. But it took the besiegers until 19 July before they managed to move two famously heavy guns the fifty miles from Olmütz to Brünn.

At the same time, the Transylvanian auxiliaries arrived – one week before Rakoczi clandestinely signed his agreement with the Emperor. While negotiating with both sides, Rakoczi expected to be paid separately for every move his forces made. Before their allies left, the Swedes as a last throw attempted a general storm on 15 August, with their batteries serving as little more than a distraction. Torstensson's forces numbered a little over 10 000 men – but only 2500 of them consisted of infantry.[19] In his invaluable history of the Swedish army in Germany, Torstensson's contemporary Bogislav von Chemnitz even dismissed

18 Gabor Karman, Confession and Politics in the Principality of Transylvania 1644-1657 (Göttingen 2020); Gerald Volkmar, Siebenbürgen zwischen Habsburgermonarchie und Osmanischem Reich 1541-1699 (Munich 2015), pp. 373-392.

19 Peter Broucek, Der Schwedenfeldzug nach Niederösterreich 1645/46 (Vienna 1989), pp. 15-20; Bretholz, Vertheidigungskampf, pp. 53-77.

Hieronymus Benno Bayer, Hans Jörg Zeiser. Brno during the Swedish siege (Section)
Muzeum města Brna – Špilberk. Wikimedia Commons

that last-minute assault as the result of a misunderstanding.[20] Souches bought an estate in Moravia, converted to Catholicism a few years later and was promoted to a Count of the Holy Roman Empire.[21]

20 Bogislav von Chemnitz, Der Königlich Schwedische in Teutschland geführte Krieg, vol. 4 (Stockholm 1859), part 5, p. 172. Unfortunately, the text for the years between 1636 and 1641 has been lost. Also see Frieda Gallati, "Der Königlich Schwedische in Deutschland geführte Krieg" des Bogislav Philipp von Chemnitz und seine Quellen (Frauenfeld 1902).

21 Peter Broucek, Biographie des Louis Raduit de Souches, in: Jan Skutil (Ed.), Morava a Brno na sklonku triceltilete valky (Prague 1995), pp. 61-69.

The Habsburg Glacis: Navigable Rivers, Towns and Fortresses

II. Between the Thirty Years' War and the Forty Years' War

In 1648, the Thirty Year' War ended with a quilt map of Germany, with a patchwork of garrisons all over the Empire.[22] Once the warring armies of the great powers had been paid off, most of these strongholds reverted to the custody of their local rulers. (Only on the Upper Rhine did it take more than a decade for the French to return the Breisgau and the "Forest Towns" to the Tyrolean cadet branch of the Habsburgs.) The estates of the Empire were formally still vassals of the Emperor who exercised a certain kind of suzerainty (if not quite paramountcy). In 1648, their right of concluding alliances with foreign powers had been reaffirmed – but at the same time questioned as these alliances must

22 See the maps provided by Antje Oschmann, Der Nürnberger Exekutionstag 1649-50 (Münster 1991).

not be directed against the Empire.[23] Put at its most basic, the Emperor's prerogatives translated into usually having to pay no entry fee for moving his armies around the Empire, quite different from France that had to pay vast amounts for its right of way.[24]

This prerogative held true for a number of fortresses that had been crucial during the Thirty Years War and might become so again, but need not be garrisoned in peace-time, thus lightening the burden of the cash-strapped Viennese. A statistic from the mid-1650s showed just 3000 men (out of c. 50 000) assigned to garrison duty within the hereditary lands, with two fortresses clearly occupying pride of place: Prague (4 companies) and Glogau (six companies); half a dozen others merited one company each.[25] Among them was Eger/Cheb, a springboard to the West, in case the Emperor was tempted to intervene, using the Main river as a supply line – Montecuccoli would do so in 1673, besting Turenne because the local rulers let him use the bridges over the river that they denied the French…

Austria proper and even Bohemia were shielded by the cosy relations the Emperor entertained with the Bavarians and Saxons across the low lying mountain ridges of Bohemia. The only part of the hereditary lands that counted as a "frontier" in the military sense of the word was Silesia that formed part of the "Sarmatian" plains geographically, with no natural barrier between Breslau and the Baltic. Silesia bordered Poland that was far from being a threat to anyone – but maybe that was the problem. Both in the 1620s and even more so in the 1650s the Swedes threatened to overrun Poland – and might as well continue into the heart of the Habsburg domains (at least that is what Vienna was afraid their French allies and paymasters wanted the Swedes to do). Alternatively, the Swedes might simply follow the Oder river upstream from their newly won bridgehead on the "continent" in Pomerania.

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23 For a brief and useful summary see Peter H. Wilson, Still a Monstrosity? Some Reflections on early modern German statehood, in: The Historical Journal 49 (2006), pp. 565-576.

24 The one significant exception to that rule was the opposition of the Rhenish League (1658-67) to letting any reinforcements for the Spanish Netherlands pass.

25 KA, AFA 142/V/47 (21 May 1658). Eger, Glatz, Troppau, Jägerndorf were each garrisoned by one company, Neisse by two. Rather surprisingly, there was no garrison assigned to Leitmeritz/Litomerice on the Elbe, with its big magazine.

In France, during the 1680s, Vauban would start thinking about dismantling fortresses that were no longer needed once Louis XIV had managed to move his borders northwards. Significantly, the Viennese jumped to the same conclusions even at a time when Silesia was once again threatened by the unpredictable Swedish warlord Carl X Gustaf. In 1655, when Ferdinand III started his rearmament drive, he sent Count Melchior Hatzfeld to Silesia to inspect the fortresses. Hatzfeld and his experts reported that most of the fortifications – less than ten years after the last bout of fighting - were in a rather dilapidated state: The standard complaint was that the ditches were so overgrown and filled with debris that one could easily cross them without getting wet.[26]

Hatzfeld prepared a list: He concentrated on modernizing and repairing the fortifications of the towns along the Oder and Neisse rivers,[27] i.e. Glogau, Brieg, Neisse. Glogau as the one closest to the border, was an obvious choice; it needed half a million bricks to be brought up to standard. Brieg was also specifically mentioned as a "*Hauptposten*". A bit of special pleading can perhaps be detected in the case of Neisse, the seat of the prince-bishop, with a population that consisted of loyal Catholics. (Most of the rest of Silesia was Protestant.) Trachenberg and Namslau[28] close to the Polish border might be regarded as advance posts (they also happened to be close to Hatzfeld's own estates in Powitzko). Breslau/Wroclaw was not mentioned. It was assumed that the prosperous metropolis of Silesia, that had avoided taking in either Swedish or Habsburg garrisons throughout the Thirty Years War, looked to its own defence.

A series of other towns, such as Liegnitz, Schweidnitz, Ohlau and Jägerndorf had customarily been garrisoned. They formed a second line of defence, removed from the Oder river (except for Ohlau). Most of them (including also Brieg) belonged to the Piast princes, descendants of medieval Polish kings, Protestant but domesticated, and only reverted to the Habsburgs in 1675.[29] The only

26 KA, AFA 137/XII/2, fol. 13. The ditch was supposed to measure 90-120 ft., the curtine 360 ft. (AFA 137/XII/3a).

27 This was the Eastern Neisse that Churchill unsuccessfully fought to have accepted as Germany's Eastern border in 1945 (rather than the Western or Lusatian one); see Martin Gilbert, Churchill, vol. viii: 'Never Despair' (London 1988), pp. 88, 117.

28 KA, HKR-Reg. 7 April 1659.

29 Ludwig Petry, Politische Geschichte unter den Habsburgern, in: idem & Josef Menzel (Eds.), Geschichte Schlesiens, vol. ii (Sigmaringen 1988), pp. 1-99, at 66-7,78-9; Hugo Weczerka

one worth preserving was thought to be Liegnitz: As a Salomonic and laissez faire solution, Vienna decided to leave it up to the owners whether they wanted to repair the fortifications or have them demolished.[30] Notabene: As one of Hatzfeld's sub-commanders warned, demolishing them also cost a lot of money, maybe even more so.[31] By the way, the money spent on the Silesian fortresses in the two or three years before 1657 totalled c. 50 000 fl.; in 1658 a lump sum of 70 000 fl. was despatched – amounts that certainly paled when compared to the millions of livres Louis XIV spent on his fortresses.[32]

Siege II: Stettin 1659

Ferdinand III and – after his death in April, 1657 – his son Leopold had reluctantly agreed to promise some support for Poland during the *potop*, when Poland was invaded from all sides, lest king Jan Casimir surrender to the Swedes. The Habsburg auxiliaries were also designed to provide an incentive for the Danes and possibly the Dutch to join the fight against the overweening ambitions of Carl X Gustaf. Hatzfeld's moves once again followed the concept of the downriver operations: They helped negotiate the capitulation of the Swedish garrison of Cracow in 1657, then to blockade the town of Torun, 200 miles further down the Vistula. However, Leopold I shied away from confronting the Swedes directly in Germany, as such a move could be interpreted as a breach of the Westphalian peace settlement – thus endangering his chances of being elected Emperor. [33]

It was only in 1659, with the Imperial election safely out of the way, that

(Ed.), Handbuch der historischen Stätten: Schlesien (Stuttgart 2nd ed. 2003), pp. lxii-lxv, 55, 131, 333.

30 KA, AFA 138/II/12, Ferdinand III to Hatzfeld, 21 Feb. 1657; the ruling was repeated the next year: AFA 142/V/60 (28 May 1658). In the case of Glogau, however, Hatzfeld was told to get the Silesian estates to pay for the repairs; but if they would not consent, Vienna was willing to shoulder the cost.

31 KA, AFA 142/VI/22b, Hunoldstein to Leopold I, 7 June 1658.

32 KA, AFA 137/XII/, HKR-Reg. 18 Sept. 1658; a florin equalled two livres. See the table in Blanchard, Vauban, p. 384.

33 Robert Frost, After the Deluge. Poland-Lithuania and the Second Northern War 1655-1660 (Cambridge 1993); Emile Haumant, La guerre du Nord et la paix d'Oliva 1655-1660 (Paris 1893); Claes-Goran Isacson, Karl X Gustavs Krig (Lund 2002).

Leopold changed his mind and ordered a full-blown offensive against Swedish Pomerania, once again a down-river operation, this time along the Oder, with Glogau acting as a starting point. His motives have been evaluated in a rather controversial fashion. One school has it that Leopold might have been trying to revive the Franco-Spanish war by round about means.[34] That ingenious conspiracy theory probably overestimates the cunning of Leopold I, or the leverage he had over his Spanish cousins. The peacemaking in the West did influence his thinking, though. He wanted to force Carl Gustaf to make peace before the French had finally settled with Spain and thus had their hands free to intervene in the Baltic.[35] Once again, there was the fear that unless the emperor was seen to be doing something, he was risking to be deserted by his Danish allies – and their sympathizers in Holland who he hoped might just be persuaded to actively intervene now that Carl Gustaf's admirer Cromwell was gone.

The obvious target for any offensive against Pomerania was the capital, Stettin/Szczecin that also served as an irresistible bait for Leopold's Brandenburg allies. The general in charge of the Austrian reserves being sent down-river was the hero of Brünn, Raduit de Souches. For him, Stettin turned into a repeat performance with inverted fronts. Defending Brünn had made him a hero, failing to take Stettin severely damaged his reputation. The countryside around Stettin was completely deserted: All the inhabitants had taken refuge in the walled towns. There were no provisions to be had even if the invaders were willing to pay in cash.[36] Digging trenches, let alone tunnels was difficult in the soggy terrain of the river estuary. Heavy artillery was to be provided by the Brandenburg allies whose depots were closer at hand. Even so, the heavy guns only showed up towards the end of October (but were not really operative because of an insufficient supply of powder).[37]

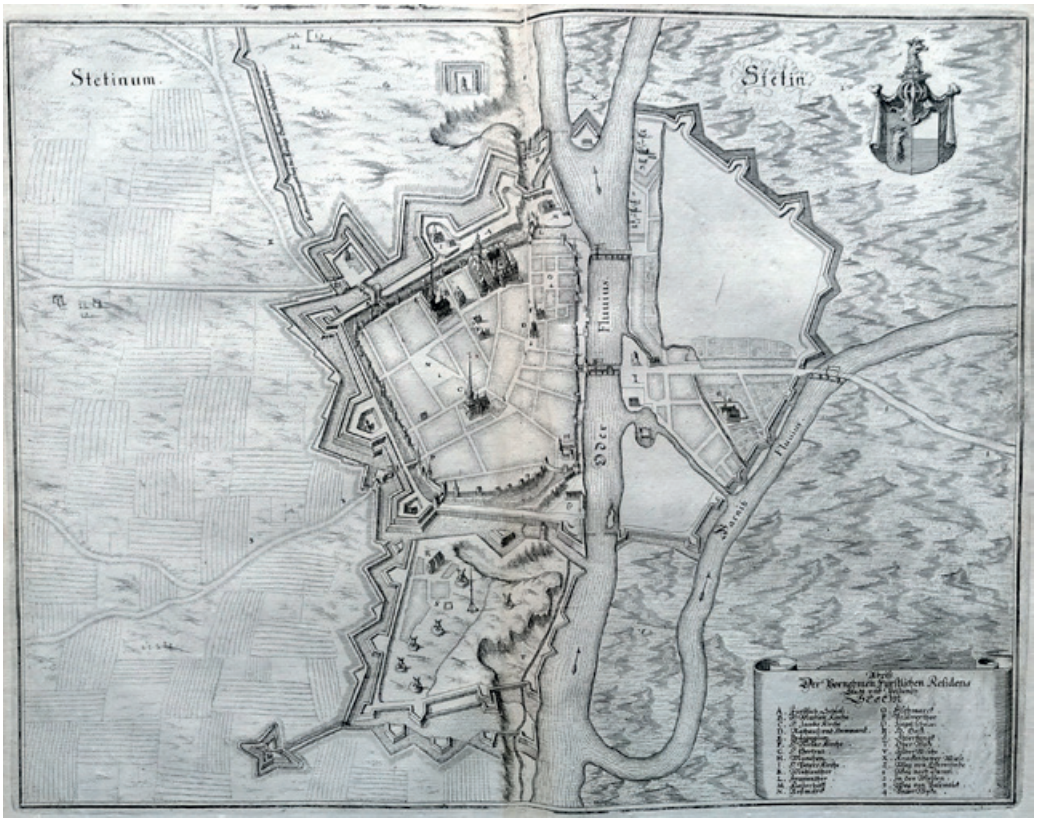
The crucial element that finally turned the tables on Souches was Swed-

34 Gustav Droysen, Geschichte der preußischen Politik, Part III: Der Staat des Großen Kurfürsten, vol. 1 (Leipzig 1871), pp. 338, 350; Eckart Opitz, Österreich und Brandenburg im Schwedisch-polnischen Krieg 1655-1660. Vorbereitung und Durchführung der Feldzüge nach Dänemark und Pommern (Boppard 1969), pp. 226, 260.

35 Alfred Pribram (Ed.), Venetianische Depeschen vom Kaiserhofe (Dispacci di Germania) 1657-1661 (Vienna 1901), p. 238 (17 May 1659).

36 KA, AFA 147/IX/15, Souches 26 Sept. 1659; 147/X/7, Souches, 8 Oct. 1659.

37 KA, AFA 147/X/30, Souches 27 Oct. 1659.



Engraving of Stettin, Swedish Pomerania, and its fortifications, by Matthäus Merian the Elder, 1652 - Topographia Electoratus Brandenburgici et Ducatus Pomeraniae
Wikimedia Commons

ish naval superiority. By mid-November, reinforcements reached the defenders via the river estuary and allowed them to start amphibious sorties.[38] Souches claimed that he had relied on Montecuccoli, nominally his superior, to close off the estuary by taking Wolgast, the town that controlled the main outlet to the Baltic. Montecuccoli denied ever having made any such rash promises and counterattacked with a severe criticism of Souches' tactics. Relations between the two foremost captains of Leopold I's early years, went from bad to worse thereafter.[39] Montecuccoli's priority clearly was the preservation of the army,

38 KA, AFA 147/XI/17 & 21, Souches 11 & 13 Nov. 1659.

39 KA, AFA 147/XI/16 & 24, Souches 11 & 15 Nov. 1659; 147/XI/7 & 24 ½ for Montecuc-

not the continuation of the siege.[40] Almost echoing Chemnitz's comments after Brünn, in his memoirs he stated that he had thought the siege a bad idea from the very beginning.[41] His decision to have the siege lifted sparked suspicions on the part of Brandenburg that the Austrians had not really wanted to conquer Pomerania for them, anyway.[42] But Leopold I was certainly keen on taking the town, if for no other reason that it would have allowed Souches army to spend the winter there, rather than turning back to burden the hereditary lands. At the very least, Stettin – whatever its ultimate fate – would have been a useful bargaining chip during the peace negotiations

III. Hungary

If there was no exposed frontier that needed to be protected within the Holy Roman Empire, just a few miles from Vienna the Habsburgs were faced with a border that could well be called the "Wild East" of the Habsburg monarchy.[43] Ever since the 1540s, Hungary – like Ceasar's Gaul - had been divided into three parts: The central plains were dominated by the Ottomans at Buda (later on amended by pashaliks in Kanizsa and Eger); the Western and Northern rim of the kingdom, centered on Pozsony (Preßburg) and the valuable mining towns in present-day Slovakia, were retained by the Habsburgs; with the autonomous principality of Transylvania in present-day Rumania – nominally a vassal of the Sultan but with close links to the Hungarian aristocracy in the Habsburg part - as the joker. Borders were porous and disputed. If ever a situation called for a series of fortifications, surely Hungary answered the bill.

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coli's criticism; Lothar Höbelt, Counts and Generals: Aristocratic Networks and the Politics of Command from Wallenstein to Montecuccoli, in: Milena Lenderova & Vitezslav Prchal (Eds.), Aquila fecit. Kolegove, zaci a pratele k zivotnimu jubileu Petra Vorla (Pardubice 2023), pp. 227-246.

40 See Leopold's orders KA, AFA 147/VIII/15 (21 August 1659).

41 Alois Veltze (Ed.), Ausgewählte Schriften des Raimund Fürsten Montecuccoli, 4 vol.s (Vienna 1899-1900), at III, p. 271.

42 True, Montecuccoli had argued that Wismar might have been a more inviting target as the Emperor could keep the town for himself (KA, AFA 144/XII/35 & 146/II/22, 16 Feb. 1659).

43 Geza Palffy, Hungary between Two Empires 1526-1711 (Bloomington: Indiana UP 2021); Lothar Höbelt, Balkan or Border Warfare ? Glimpses from the Early Modern Period, in: Balcanica 50 (2019), pp. 85-103.

Of course, the first thing that springs to mind in that connection is the famous "Military Frontier" of the Habsburgs, organized on the basis of a peasant militia freed from feudal dues – and often composed of refugees from the Ottoman Empire.[44] However, the institution of the Military Frontier was restricted to a rather small part of the Habsburg frontiers in the East. It included a few powerful fortresses such as Karlovac and Petrinia, but it was supposed to protect not Hungary proper but the Kingdom of Croatia. It went back to the days when "Inner Austria" (Styria, Carinthia, Carniola) had still been governed by a cadet branch of House of Habsburg residing in Graz, from 1564 to 1619. During the 1570s an arrangement had been worked out that provided for the estates of those three provinces to pay for the up-keep of the fortresses in the Military Frontier – in return for reserving most of the plum jobs for their members.

Further north, in Hungary proper, there were only faint echoes of such a "special arrangement". The estates of the hereditary lands did pay a certain sum towards the up-keep of the main Habsburg fortresses on the Danube, but did not have any say in the choice of their commanders. There were no watch-towers manned by a peasant militia but a lot of castles and make-shift Wild West style forts (palankas), owned by Hungarian magnates who used them as starting points for raids against the enemy who had deprived them of their lands and serfs further South. Both sides tried to levy taxes on both sides of the border, nor were they averse to raids on convoys and the taking of prisoners that were going to be ransomed. One statistic put the number of these strongholds at no less than eighty-eight. On average, the feudal hosts stationed in them counted roughly 10 000 men.

The fight against the infidels was a holy enterprise that easily topped every list of politically correct behaviour. In practice, though, the antagonism between the emperors of the East and the West foreshadowed the latter day slogan of peaceful co-existence. The papal nuntio was exasperated: People in Vienna treated the Turkish menace as if the Sultan was as far away as the Emperor of China.[45] Actually, from 1606 to 1683 there was only one brief interlude of open

44 The classic account is Gunther E. Rothenberg, The Austrian Military Border in Croatia, 1522-1747 (Urbana 1960); for a detailed study of the earlier period see James D. Tracy, Balkan Wars. Habsburg Croatia, Ottoman Bosnia and Venetian Dalmatia, 1499-1617 (Lanham 2016).

45 Arthur Levinson (Ed.), Nuntiaturberichte vom Kaiserhofe Leopolds I., vol. II (Vienna 1918),

warfare between Constantinople and Vienna, in 1663-64. Both sides had grown tired of organizing campaigns in an area that was too poor and too ravaged by the almost constant small-scale warfare to support large armies.[46] The Spanish ambassador (admittedly a biased observer) viciously commented the Emperor should refrain from sending any reinforcements East as they would only die from hunger.[47]

Once again, any defensive effort concentrated on the rivers, i.e. the river, the Danube. There were two fortresses that occupied pride of place in the Habsburg cosmos, both of them located less than a hundred miles East of Vienna, Raab/ Györ, on the right bank of the Danube where the Raab river entered the Danube, had become famous because the commander who lost it in 1594 had been decapitated *pour encourager les autres* – and the one who had re-captured it in 1598, Count Adolf Schwarzenberg, added a raven (Raab) to his coat-of-arms that picked an eye out of a hapless Turk.[48] Maybe even more important strategically was Komarom on the left bank of the Danube, at the confluence with the Vah river, 25 miles down-river from Raab, which served as the main river port of the Austrians and received most of the investments once there was a crisis brewing in Hungary.[49] A third one, Neuhäusel (Ersekujvar, Nove Zamky) on the Vah, was lost to the Turks in a half-finished state in 1663.

On the face of it, the distances between this triangle of fortresses should make it easy for them to reinforce each other in case of need. In practice, at least during the early stages of a campaign in spring, the Danube was likely to flood the surrounding country-side, making any bridge-building impossible. In early 1661, Count Adolf Puchheim, the Komarom commander, reported that almost the whole territory between him and the other two fortresses, was submerged; the view toward Ersekujvar resembled a lake rather than a river. Rather than look for the material to build giant bridges, he proposed using galleys (tschaik-

p. 129 (30 Oct. 1672).

46 Geza Palffy, Die Türkenabwehr in Ungarn im 16. und 17. Jahrhundert – ein Forschungsdesiderat, in: Anzeiger der philosophisch-historischen Klasse 137 (2002), pp. 99-131.

47 Oberösterreichisches Landesarchiv (OÖLA), Lamberg 1226/186 (4 Feb. 1656), quoting from one of Castel Rodrigo's reports.

48 Fürst Karl zu Schwarzenberg, Geschichte des reichsständischen Hauses Schwarzenberg (Neustadt/Aisch 1963), pp. 106-7.

49 See e.g. HKR-Reg. 21 Jan. & 17 March 1660.

en – the Cossack term for sea-gull had been adopted) that towed "*Pletten*" (an Alpine variety of what in Mississippi folklore would be called keelboats). As many as fifty horses could be transported on the *Pletten*, he claimed, but wagons could not.[50]

For all the drama of the wars of Louis XIV, the borders of the Emperor's hereditary lands in the West remained the same. The only change occurred in "*Vorderösterreich*", the Swabian territory inherited together with the Tyrol in 1665. Leopold lost Breisach after the Dutch War in 1678 – and regained it after the Nine Years War in 1697. In the East, however, there was a noticeable change even before the big reconquista started after the 1683 Siege of Vienna. György I. Rakoczi, who was so coy about joining Torstensson in front of Brno, had been bought off with no less than seven counties in 1645. They were his only for his lifetime, though. When he died in 1648, the bulk of his windfall gains, up to the river Tisza, reverted to the Habsburgs. The main town of that area clearly was Kassa (Kaschau/Kosice). Kassa did not lend itself as a bulwark of Upper Hungary, however, because its Protestant burghers steadfastly refused to take in a Habsburg garrison that might turn out to be the thin end of a Counter-Reformation wedge. For the time being, Habsburgs had to rely on the castles of Hungarian magnates, scattered through the mountain range between the mining towns and Kassa, such as Levenc, Szendrö, Filek and Murany.[51]

But Rakoczi's son, György II, overplayed his hand in 1657: He managed to antagonize both the Habsburgs and the Ottomans when he entered the war against Poland on the side of the Swedes. The Habsburgs felt he was sufficiently chastised by his defeat at the hands of the Tartars. The new Ottoman Grand Vizier, Mehmed Köprülü, however, insisted on "regime change".[52] Vienna's attitude could easily be summed up as: A plague on both your houses: They

50 KA, AFA 153/VI/9 (5 June 1661), 31 (14 June 1661), 48 (18 June 1661); Noel Buffe, Les Marines du Danube 1526-1918 (Paris 2011), pp. 78-81, 95.

51 Every now and then the Hungarians received small subsidies to maintain their forts; e.g. HKR-Reg. 9 Jan. 1659 (Csaky for Lewenc).

52 Metin Ibrahim Kunt, The Köprülü Years 1656-1661 (Ann Arbor 1971); Gabor Karman, Die Krise des Fürstentums Siebenbürgen in den Jahren 1657 bis 1661. Eine Vorgeschichte es habsburgisch-osmanischen Krieges von 1663/64, in: Heeresgeschichtliches Museum (Ed.), Das "Dreiecksverhältnis" zwischen Polen, Osmanen und Habsburgern (Vienna 2022), pp. 85-113.

cared neither for Rakoczi, the perennial trouble-maker, nor for the Ottomans who threatened to engulf an ever bigger part of Transylvania, thus inching ever closer to Upper Hungary. Their "modest proposal" to the beleaguered culprit was that rather than risk losing his whole fortune to the enraged Turk he should turn over the two counties beyond the Tisza (Szabolcs and Szatmar) where most of his family holdings were located. In turn, Vienna promised that he would still be entitled to the income from them – and that the counties would be returned once the danger was past.[53]

Before the deal had been finally concluded, in June 1660, the irrepressible Rakoczi met his sticky end in a fight against the Ottomans. Unfortunately, Köprülü was still not content with the elimination of his bete noire but insisted on a few key fortresses, guarding the frontiers between Transylvania and the Ottoman part of Hungary, in particular Nagyvarad (Großwardein/Oradea). Once Nagyvarad had succumbed to the Ottomans, the Habsburgs needed a stronghold east of the Tisza to counterbalance it. [54] The obvious choice was Szatmar (Satu Mare), located on a tributary of the upper Tisza in the far north-eastern corner of the great Hungarian plains, with easy access to Transylvania.[55] Whereas Kassa was still reluctant to admit a garrison, in the future at least one regiment (often two) was always stationed in Szatmar which remained in Habsburg hands even when part of the intervening countryside was overrun by Hungarian rebels or – in 1663 or 1683 - Ottoman forces.[56]

53 KA, HKR-Reg. 21 & 30 June 1659, 26 Aug. 1659, 9 Sept. 1659; for background information see Alfred F. Pribram (Ed.), Venetianische Depeschen, pp. 246, 272, 331, 367.

54 This imperative was clearly spelt out in KA, HKR-Reg. 12 Sept. 1660; marching orders to occupy the two counties and their fortresses had already been issued on 14 & 29 June 1660; also see Pribram (Ed.), Venetianische Depeschen, pp. 462 (27 July 1659), 575 (5 Feb. 1661).

55 A conference of Imperial ministers praised Szatmar fulsomely in the spring of 1662: It could only be conquered by a formal siege, was located in a fertile area and could accommodate up to 7 or 8 000 men (HHStA, Turcica 134, III-V 1662, fol. 26 v.)

56 Florin Nicolae Ardelean, War and Social Conflict in the Early Modern Border Areas: Colonel Ludovicus e la Borde and Satu Mare (Szatmar) Fortress (1673-77), in: Hiperboreea 8 (2021), pp. 16-37; Thomas M. Barker, Double Eagle and Crescent. Vienna's second Turkish siege and its historical Setting (Albany 1967), p. 291.

Siege III: Ersekujvar 1663

The post-Rakoczi tug-of-war between Habsburgs and Ottomans did escalate into a brief full-scale war in 1663. That summer, Grand Vizier Fazil Ahmed Köprülü (1661-76), Mehmet's son, targeted Ersekujvar. Arguably, of the three key fortresses, it was the easiest choice. Half of its six bastions were said to be unfinished, with little brickwork. Yet, the Austrians seem to have been blithely over-confident. In the beginning, they seem to have believed that the over-flowing Danube would prevent the enemy from starting any worthwhile operations.[57] Even after the start of the siege, Johann Ferdinand Portia, Leopold I's first Minister, dismissively told the ambassador in Madrid that the Turks were attacking in force but without art.[58] The Ottoman advance had thrown the Austrians on the defensive, though. To cover their siege, the Turks unleashed Tartar raids against the Austrian hinterland that created a panic in Vienna. For once, almost the whole peace-time army was needed as garrisons. Their mobile field forces were given as between 6 000 and 9 000 men only. A relief expedition was clearly out of the question. [59]

Matters were complicated by the long-standing rivalry between the German Count Adolf Puchheim, the commander of Komarom, and the Hungarian Count Adam Forgach, the commander of Ersekujvar – both of them from politically well-connected aristocratic families. Forgach had lost part of his infantry when he attempted to surprise the Ottoman advance post at the bridgehead at Parkany on 7 August, but turned out to be too late: By the time he arrived, the bridge had already been finished and he was met by an overwhelming force.[60] But when asked for reinforcements, Puchheim proved less than eager to help. On the one hand, he made fun of the supposed pusillanimity of his opposite number in Ersekujvar; on the other hand, he protested that it was irresponsible to risk denuding Komarom.

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57 HHStA, Spanien 47/726, fol. 21 & 29, Trauttmansdorff to Pötting (25 July & 8 August 1663).

58 HHStA, Spanien 47/721, fol. 46, Portia to Pötting (20 Sept. 1663).

59 HHStA, Spanien 47/721, fol. 32, Portia to Pötting (6 Sept. 1663); Georg Wagner, Das Türkenjahr 1664. Eine europäische Bewährung (Eisenstadt 1964), pp. 80-3.

60 HHStA, Spanien 47/721, fol. 15, Portia to Pötting (23 August 1663).

La famosissima Piazza di Neuhausel nelli Confini di Vngaria assediata da Turchi li 13 Agosto 1663.
Questa Piazza fabricata in forma di Stella con sei Baloardi cinta da una fossa d'acqua e situata in una palude, si è fatta conoscere p una buona brigata del nemico

Stefano Scolari, *La famosissima Piazza di Neuhausel nelli Confini di Ungaria assediata da Turchi li 13 Agosto 1663*. Wikimedia Commons

Forgach claimed that it was still possible to send reinforcement into Ersekujvar at night via the Vah river which was largely unguarded but only knee-deep. Scouts, suitably disguised as farmers with scythes, had allegedly often used this route. Puchheim scoffed that it was a very different proposition to insert a thousand musketeers who would be given away by their burning matches. Moreover, in an interesting aside, he turned the dismissive attitude towards Hungarian light infantry (*hajduks*) on its head: Hungarian irregulars would think nothing of running fifteen miles across the wilderness and at the end of it swimming through a river. But Puchheim's regular musketeers could not be asked to emulate such artistry. In the end, the peasant guides refused to risk a return trip with such heavy baggage in tow. The full moon served as an extra excuse why no such experiments could any longer be tried.[61] Forgach claimed that he had still man-

61 KA, AFA 160/IX/4 & 46, Puchheim to Montecuccoli (2 & 10 Sept. 1663). The Hungarian

aged to attract 115 hajduks to join him, with promises of three months pay and freedom from all feudal obligations; but only thirty of them survived.[62]

The Turks may not have been adherents of Vauban's clinical doctrine of substituting hard labour for costly fighting but they seem to have followed state-of-the-art practice:[63] They moved their siege guns to advanced positions, build a platform overlooking the enemy fortifications and dug half a dozen different mines. In the last stage they started building galleries across the ditch and at one point managed to plant more than a dozen of their banners on top of one of the make-shift bastions. Forgach twice repulsed Ottoman attacks but suffered huge losses as his men ran out of ammunition. Vauban would have been the first to admit that now was the time to bow to the inevitable. The siege had lasted only a little less than the forty-one or forty-eight days that he mentioned as a rule of thumb[64] (but then Ersekujvar did not boast of any of the outworks able to delay a siege, such as demi-lunes or horn-works).

If any persuasion was needed, Forgach and his second-in-command, the Italian Marchese Pio di Savoia, both claimed that their soldiers had threatened to disobey orders if forced to continue the pointless fight. The Ottomans did not try to profit from the confusion among the defenders – with more soldiers arguing in the streets than manning the fortifications - but gave them twenty-four hours to make up their minds. Following what was going to be standard practice after an honourable defence, on 25 September the garrison was allowed to leave Ersekujvar with all their belongings, flying colours, burning matches and four cannon.[65] During their retreat, Ottoman regulars protected them from Tartar raiders. It was Puchheim who was scandalized because he regarded the surrender as a bad example. He admitted: "The Grand Vizier has observed the terms of the accord punctualissime", but added: "it were to be wished that he had massacred them all because of the evil consequences."[66] Soldiers would henceforth draw

light infantry, like dragoons, were equipped with wheel-lock carbines. See Ernst Gabriel, Die Hand und Faustfeuerwaffen der habsburgischen Heere (Vienna 1990), pp. 24, 26.

62 KA, AFA 160/XII/8c, fol. 562 v.

63 Also see Kahraman Sakul's contribution in this volume.

64 Dominique Le Brun, Vauban. L'inventeur de la France moderne (Paris 2016), p. 401; Blanchard, Vauban, p. 94.

65 HHStA, Spanien 47/726, fol. 43, Trauttmansdorff to Pötting (30 Sept. 1663).

66 KA, AFA 160/IX/113, Puchheim to Montecuccoli (28 Sept. 1663). Moreover, Puchheim did

their own lessons from that example and no longer be willing to fight to the bitter end. Forgach was arrested and subjected to an investigation that centred at least as much on his excess of fighting spirit at Parkany as on his surrender of Ersekujvar. His line of defence was that even the strictest orders could not oblige him to perform "impossibilities".[67]

The dismal outcome of the 1663 campaign forced Leopold I to accept help from France (and her German allies in the Rhenish League), something he had very much hoped to avoid. As a result, Montecuccoli's victory at Szentgotthard (1 August 1664) was often hailed as a "European achievement". Leopold I, however, was determined to cut that experiment short. To the disgust of his Hungarian subjects (and no doubt, also Louis XIV's), he used that battle as an opening to conclude an armistice with Köprülü as soon as possible: Ersekujvar remained in Ottoman hands; Leopold I started to build a new fortress a few miles further West, appropriately named Leopoldstadt. [68]

IV. Conclusion

In the future, Habsburg rulers in Vienna would often complain about their long, dry borders that made them vulnerable to attack from almost any direction. In the mid-17th century, those disadvantages were far from obvious. The hereditary lands of the Vienna Habsburgs were surrounded by a glacis, composed of Poland and the estates of the Holy Roman Empire that insulated them from any immediate aggression. Thus, they did not really need any *ceinture de fer*. Of course, that relaxing state of affairs no longer held true, if one took into account Leopold I's responsibilities towards the Empire and his Spanish cousins. Seen from that perspective, distance no longer served as a shield but as an impediment. The saving grace was that the hereditary lands were located on the upper reaches of almost all the great navigable rivers of Central Europe,

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not know what to do with the 2500 survivors that arrived in Komarom the day after – and threatened to deplete his reserves of victuals.

67 KA, AFA 160/XII/8a (questions) + 8b (answers) + 8c (Forgach's defence); also see the entry in Antonio Schmidt-Brentano, Die kaiserlichen Generäle 1618-1655 (Vienna 2022), pp. 154-7.

68 Ferenc Toth, Saint-Gotthard 1664. Une bataille europeenne (Paris 2007); Wagner, Türkenjahr, pp. 437-40.

from the Rhine to the Danube, and the Elbe to the Vistula. If they wanted to intervene in Northern Europe, Habsburg armies simply had to follow those rivers downstream – which was a lot easier than working up-hill. Leopold I was right to conclude: "We have the rivers in our favour."[69] The fortresses that mattered were the ones that dominated the traffic along these rivers.

Almost the same held true for the Eastern frontier in Hungary: Given their meagre financial resources, Ferdinand III and Leopold I certainly tried to run an Empire on the cheap. The Habsburg "state" concentrated on a triangle of fortresses along the Danube – and delegated the defence of the rest of the kingdom to Hungarian nobles and the Inner Austrian estates. The one exception to that rule was far-off Szatmar that proved to be a persistent thorn in the flesh of any opponent. That sometimes less than benign neglect was not without its political risks. The Hungarians were jealous of their autonomy but yearned for a war of liberation against the Ottomans. The scant support they received from Vienna in that respect (combined with some heavy-handed Counterreformation activities) gave them both cause for dissatisfaction – and an opportunity to make their dissatisfaction felt, as a series of rebellions and conspiracies would demonstrate.[70]

The three examples of sieges included in this brief survey do not represent milestones in the history of warfare. If anything, they demonstrate the rather make-shift character of fortresses and sieges in Central Europe, compared to Western "high tech" alternatives. However, Brünn (with the Swedes in front of Vienna) and Stettin (with the Imperial army once again operating on the Baltic) define high-water marks in the far-ranging and volatile contest between the Emperor and Sweden. They are also good examples of the way this contest was no clear-cut confrontation of great powers, but always complicated by relations with uncertain allies. Of course, the relationship with allies, far more dominant and powerful ones, conditioned the Imperial war effort of the next generation, during the Forty Years War, from 1672/73 to 1712/13.

69 KA, AFA 147/VIII/15, Leopold to Montecuccoli, 21 August 1659. The one exception, of course, was following the Danube up-river. Supplies then had to be transported by ox-cart from Ulm to the Neckar and the Rhine. (Höbelt, Jankau bis Nördlingen, pp. 109-110).

70 Georg Michels, The Habsburg Empire under Siege. Ottoman Expansion and Hungarian Revolt in the Age of Grand Vizier Ahmed Köprülü (1661-76) (Montreal 2021).

Gerard Valck, Fluminum princeps Danubius : ab ipsa scaturigine in Suevis qui exortus, caeteras Germaniae regiones in ortum septentrionalem Europeum Turcicam sinuosô flexu interlabitur donec multis auctus amnibus per plura Pontum in Euxinum ostia se exonerat (ca. 1702). Upload by Biblioteca Comunale di Trento. Wikimedia Commons

Fortress Siting
An Aspect of Fortress Warfarery

by Ulf Sundberg [1]

Introduction

Fortifications allow few to fight the many. The practice may have originated when early humans realized that holding the high ground gave a strategic advantage in battle. The idea of reinforcing elevated positions likely followed soon after.

The height advantage remained important for a long time. Technological progress changed fortress warfare. An important key feature would, however, remain. A fortification served to channel enemy forces, preventing a larger force to wipe out a smaller one, as it might on open ground. This channeling effect could be achieved in various ways. In earlier times, the number of ladders raised against a fortress wall would have been a channeling factor. With the advent of artillery, the breaches shot in fortress walls would create small gaps where only a limited number of assailants could enter at any time.

Increased artillery power has, in a way, changed the logic of fortress warfare. Artillery has become more devastating, while fortifications have adapted by becoming lower in profile and better protected. However, the fundamental principle remains unchanged. Artillery alone rarely succeeds in reducing a fortification, and an infantry attack is typically required in the end.

There is, however, one important exception to the rule described above. If no other means of subjugating a fortress are available, it can be surround, its supply lines cut, and its defenders starved into submission.

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This article focuses on the importance of fortress siting in relation to the possibility of resupply, and how this could prevent a surrender that would otherwise have been inevitable. Following this introduction, three examples of the importance of fortress siting will be presented, two from the Great Northern War (1700–1721) and one from modern times (Tobruk 1941). Finally, the general implications of fortress siting for Sweden during the Great Northern War will be briefly summarized.[2]

There are several ways to classify fortresses, but one method will be introduced here. We can subdivide fortifications into two categories: "the stand-alone fortress," which is a purely military construction, and the city fortification, which is designed to protect a city and its population.

Attacking a Fortress

Once man began fortifying themselves, the art of conquering fortresses emerged, developing parallel to the art of fortification. Conquering fortresses captivated the sharpest minds in various societies.

Since humans tend to economize, non-violent solutions were most often preferred. If the will to defend a fortress was weak, psychological warfare could prove effective. This form of warfare targeted the vulnerabilities of the fortress commander. He might be politically exposed, overwhelmed by the threat of certain death, or susceptible to bribery.

Similar tactics could also be used to subdue the garrison. The population in a besieged city fortress could be threatened or bought off by promises of increased privileges in case of a swift surrender. Alternatively, they might yield to the mounting fear of the horrors of a prolonged siege.

The coup de main served as an alternative to psychological warfare, relying instead on surprise. If a smaller force somehow could be introduced into the fortress, it could either defeat a surprised garrison at once or it could open a gate to let larger segments of the besieging army to enter.

If the above measures failed, the attacking army might attempt to scale un-

2 This article is mainly based on two works by the author. The first is *Swedish Defensive Fortress Warfare in the Great Northern War 1702–1710* (Åbo 2018) and the second is *Resupplying Tobruk in 1941* (unpublished manuscript from 2007).

damaged walls. This tactic could be successful against a fortress with extensive walls and a small garrison, but it carried significant risk and could result in a failure with heavy casualties.

If psychological warfare and any coup de main had failed, and the attackers were unwilling to risk scaling undamaged walls, the besieging army might resort to breaking through the fortification walls at one or several points. Once breaches had been made, the defenders could be called upon to surrender, or the besieging force could storm the gaps. If successful in any of these endeavors, the besieging army would capture the fortress.

With all other options exhausted, the besieging army would have to cut off the fortress from supplies. When the supplies in the fortress had run out, the fortress commander faced only two choices: to surrender or to see his garrison die from starvation. In either case, the fortress would eventually fall.

Defending a Fortress

Once a nation found one of its fortresses under siege, the leadership could not expect it to hold out indefinitely. If nothing else, it would fall when its supplies ran out. If the fortress succumbed to psychological warfare or rapidly fell in any other way, the defending nation had no recourse but to attempt its recapture.

If the fortress held out, the defending nation faced two options: either to send a relief army to defeat the besieging army or to try to maintain the besieged fortress. Dispatching a relief army would be the most efficient solution, but also the costliest. A hard-pressed defending nation was unlikely to have a relief army readily available. Thus, the alternative of maintaining the fortress under siege was often viewed as the more desirable course of action.

A well-manned and well-supplied fortress could be expected to hold out on its own for a long time. The most critical limiting factor was food supply. Other important considerations included manpower, ammunition, money, and morale. Normally, a siege would result in casualties within the fortress, potentially leading to dangerously low manpower levels in the garrison. Ammunition would inevitable be depleted, and money was, often overlooked, crucial for paying the garrison and purchasing food—either from the burghers in a besieged city or to inspire stealthy deliveries from the outside to the fortress.

Maintaining a fortress under siege thus become a matter of bringing in reinforcements and essential supplies. Moving men and supplies always constitutes a logistical problem in itself. The fact that the fortress was under siege with a hostile force blocking all supplies from reaching it made the task even more complicated. Bringing men and supplies overland to a besieged fortress was virtually impossible. Any transport escorted by a force smaller than the besieging army risked immediate capture. A relief by land would call for a relief army.

The second, and most viable, alternative was to resupply the fortress by sea. Ships could carry large quantities of provisions and reinforcements, and the besieging army could not fight ships unless it had naval resources of its own.

Fortress Siting

The siting of a fortress had several important implications for its defense. From a logistical standpoint, there were two fundamentally different types of siting: inland or by the sea. Unless a relief army could be organized, a besieged inland fortress had no realistic hope of survival. In contrast, a coastal fortress could, under the right conditions, be resupplied by sea.

A fundamental condition was that the defending nation had to control the sea from the points of departure to the fortress. Moreover, upon arrival, the ships must be able to land reinforcements and discharge supplies in a manner that brought them into the besieged fortress.

In the context of fortress warfare, "control of the sea" was more nuanced than the general concept. Command of the high seas was the first requirement. If the besieging nation had a fleet that could stop a resupply convoy, i.e., defeat their escorting men-of-war, there would be no resupplying of the fortress.

The next challenge for the resupply fleet was reaching the immediate vicinity of the fortress. Here the exact siting of the fortress became critical. For a fortress located directly on the coastline, the problem would not arise.

However, many fortresses and fortified cities were situated at some distance from the open sea. The fortification could be sited a few miles up a river, at the end of a narrow bay, or shielded by a cluster of islands between the sea and the entrance to the fortification.

The map above, dated 1571, and depicting Venetian holdings in the Balkans, illustrates the resupply problems quite well. The city of Ragusa, to the left in the map, was well-sited. In 1571, army units would find it difficult to block the entrance to the city. There was also a sail-in function to a protected discharge place. As long as the walls held and Venice kept control of the Adriatic Sea, Ragusa remained defensible. The city of Castel Novo, in the middle of the map, presented greater challenges. Whether army forces could block the entrance remains an open question. However, the city lacked a sail-in function, and discharging under the eyes of an enemy could be complicated. The city of Cattaro, in the upper right of the map, was in a potentially dangerous position. Depending on the hydrographic conditions within the bay, the city could possibly be blocked by an army. Cattaro lacked a sail-in function, and, depending on the exact geography, the enemy might have been able to make discharging a dangerous affair. (Map: Atlas factice des possessions de Venise et de l'Archipel, G. F. Camocio, 1571, Bibliothèque nationale de France, Wikimedia Commons.)

Normally, a besieging army lacked warships. However, they usually included an engineering unit capable of constructing various structures, such as log barriers, to obstruct waterways. The besieging army could defend their barriers

by batteries and small arms fire. If the besieging army could create a "last-mile problem" for the resupply fleet, no supplies would reach the fortress.

All waterways that could be obstructed by conventional army units might be described as "army-blockable." The resources and the ingenuity of the army engineers, along with the width of the waterway, determine whether a waterway is blockable or not. When a stretch of water is wide enough, it could be deemed non-army-blockable. Examples of such waterways include the Sound (Öresund) and the English Channel.

Even if a resupply fleet could reach the besieged fortress, one problem remained – discharging. If the besieging army could prevent the landing of troops and supplies, the fortress would not be resupplied. Interference typically involved subjecting the landing area to artillery fire, making the unloading operation too hazardous to proceed. The matter of a protected discharge place did, however, not only pertain to artillery. If the besieging army, for example, could hold the potential discharge place with infantry, it would be just as disastrous for the besieged.

The ideal solution to the problem of a protected discharge place would have been a "sail-in function." This concept referred to a harbor located within the fortress itself, into which ships could sail and be protected by the fortress walls while discharging.

Conclusions

A successful long-term defense of a fortress thus depended on command of the sea, a lack of army-blockable waterways along the supply route, and a protected discharge place, ideally integrated into the fortress as a sail-in function.

It becomes clear that the geography surrounding an individual fortress and the supply chain leading up to it would be important. In an extreme case, the besieging nation's army could prevent the defending nation's supply ships from leaving their port of origin, thereby dooming the fortress from the outset. More commonly, the besieging army could block supply routes closer to the fortress.

Fortress warfare has sometimes evolved around resupply routes, which are vital. Naval dominance on the high seas was not always the decisive factor. If fortresses were located along a coastline, the water leading up to them was

often quite shallow. Since ships-of-the-line and normal frigates could not enter shallow waters, this limitation led to situations in which battles between small, shallow-draft vessels determined the outcome, regardless of the situation on the high seas.[3] From the theoretical structure above, the article will continue with three examples of how these principles played out in practice.

Riga

An Army-Blockable Waterway

In the Great Northern War, the main Swedish army was virtually annihilated at the Battle of Poltava in July 1709. This decisive defeat left the principal Russian army free to advance against Swedish possessions in the Baltic region. The strongly fortified city of Riga was the key to Sweden's control of Livonia, today's Latvia. The city had been captured from Poland after a Swedish siege in 1621.

Riga is situated on the Daugava River, known in Swedish as the *Düna* River, approximately fifteen kilometers upstream from the Baltic Sea. During Swedish rule, a new fortress named Neumünde was built by the mouth of the Düna River. Following the Battle of Poltava, Tsar Peter detached Field Marshal Count Boris Sheremetev with about 30,000 men to lay siege to Riga. His orders were not to storm Riga, but to starve the city into submission.

As the main Russian army was approaching, all Swedish troops in Livonia withdrew into Riga, increasing the city's garrison to over than 10,000 men. At the onset of the siege, the civilian population was estimated at around 45,000. Lieutenant General Count Nils Stromberg exercised the supreme command in Riga. Given the strategic importance of the Düna River, the city maintained a modest naval presence consisting of a small ship armed with four 3-pounders, as well as two floating batteries – each equipped with ten 8-pounders and ten 4-pounders. The flotilla was under the command of Lieutenant Michael Henck.

The Swedish navy maintained control of the open sea, the Baltic Sea. The

3 This introduction is based on Ulf Sundberg, *Swedish Defensive Fortress Warfare in the Great Northern War 1702–1710* (Åbo, 2018), a dissertation for the doctor's degree. ("Sundberg 2018" below.)

Russian navy was still too weak to challenge Swedish ships-of-the-line. The Danes had entered the war against Sweden in late 1709, but they showed little willingness to employ their fleet in support of the Russian siege operations.

The Siege

The fate of Riga would ultimately be decided by control of the Düna River. If the Russians succeeded in blocking it, Riga would starve; if not, Swedish forces would resupply it. On October 24, the first Russian troops closed in on Riga. Five days later, Stromberg declared that Riga was cut off by land. Throughout November, the Swedish river flotilla engaged in skirmishes against Russians manning small boats, but the riverine war came to a halt as the river froze in December. At the same time, the supplies in Riga were running low, and both humans and animals began to starve.

During the winter, the Swedish Council, ruling Sweden in the absence of King Charles XII, prepared to resupply Riga as soon as the ice broke, which occurred on April 5. The Russians immediately began work to block the river. On April 14, there was work in progress in Riga on fifteen boats to clear the river, each armed with one cannon.

On the night of the 22nd, five Swedish boats engaged in a skirmish against sixty Russian boats. The riverine struggle persisted, but on the last day of April, all efforts to maintain communication between Riga and the Neumünde fortress had failed. The Russians supplemented their blocking with a cable over the river and built several batteries along the shores to protect their works.

On May 11, a Russian bridge over the Düna River was completed. This bridge was the final closure of the river route to Riga.

At Karlskrona, the main Swedish naval base, Swedish General Admiral Hans Wachtmeister equipped and dispatched four men-of-war, three frigates, and a bomb vessel. Under the command of Lieutenant Peter Krook, these ships departed Karlskrona on May 23.

A considerable fleet of Swedish ships was soon assembling off Neumünde. Six transports from Stockholm, carrying supplies, arrived. On June 1, Krook's squadron of three frigates and a bomb vessel entered the waters. The following day, 700 troops from Stockholm arrived on transports, escorted by a frigate.

A task force was now assembled to break through to Riga. Each of the three largest ships had two large boats attached to it. They equipped each large boat with a cannon. The boats were also loaded with petards, saws, axes, and boxes with explosives intended to demolish the Russian barriers blocking the Düna River. Eighty men from the garrison of Neumünde, trained in the handling of explosives, manned the boats. Transports had their crews augmented by one subaltern officer from the Neumünde garrison and twenty soldiers.

On June 10, the Swedish ships sailed up the Düna River, starting a five-hour artillery duel with the Russian batteries. Russian troops swarmed to the shores, fiercely returning the Swedish fire. Despite the intense fire, neither side achieved any decisive results. The Swedish gunners could not silence the Russian batteries, and the Russians could not inflict serious damage on the Swedish ships. This stalemate, however, proved critical: it prevented any Swedish landings and made it impossible to dismantle the Russian river blockades. At seven o'clock in the evening, the Swedish ships withdrew and stopped under the guns of the Neumünde fortress. The attempt to deliver supplies to Riga had failed.

Following the battle, Lieutenant Krook and the commander of the Neumünde fortress wrote letters to the Swedish Council. They underlined that only a relief army could save Riga and that not even the entire Swedish fleet could reach the city unaided.

On June 28, Stromberg requested a cease-fire. The battle for Riga had effectively come to an end. Stromberg signed the surrender document on July 4.[4]

Riga. Conclusions

Sweden had now paid a high price for having one of its main fortifications sited along an army-blockable river. The history of the siege of Riga is one of many where the defending nation held naval supremacy but relied on a short, army-blockable stretch of water for reinforcements and supplies to reach the garrison.

4 This paragraph is based on Sundberg (2018), pp. 229–271.

A note on sources

An important early Swedish work on the siege of Riga is Fredrik Arfwidsson's dissertation *Försvaret av Östersjöprovinserna 1708–1710*, Part I–II:1 (s. l. 1936). [The Defense of the Swedish Baltic Provinces, 1708–1710]

Among the primary material, there are two diaries from the Swedish side. An anonymous person, likely a Swedish officer in the garrison, wrote the more important diary: "Journal öfver staden Rijgas belägringh af Muscowiterne annis 1709 och 1710 från och till datum som följer" [A Diary of the Siege of the City of Riga by the Muscovites in the Years 1709 and 1710 From and To the Following Dates] published in Gustaf Floderus (ed.), *Handlingar hörande till konung Carl XII:s historia*, Part III, (Stockholm 1824). [Documents Belonging to Charles XII's History]

Russian views are presented in *Journal de Pierre le Grand* (Paris 1773) and in a modern work by Boris Grigorjev & Aleksandr Bespalov, *Kampen mot övermakten: Baltikums fall 1700–1710* (Stockholm 2012). [The Struggle Against Superior Forces: The Fall of Sweden's Baltic Provinces 1700–1710]

The map above aligns the north to the right. The city of Riga is seen in the lower part of the map, with the Baltic Sea and the Neumünde fortress in the upper left corner. The map clearly illustrates that Riga was susceptible to an army blocking of the river between the Baltic Sea and the city, a fact that would cost Sweden dearly. The map depicts a short Saxon siege of the city in 1701. The bridge shown just west of Riga was a temporary one, built by the Saxons. (Map: Staden och fästningen Riga med omnejd år 1701, nr 1701:08, Volume 14 Omslag 1701–1704, Förteckning 426 Historiska planscher 1520–1904, Krigsarkivet.) (Detail.) [The Swedish Military Archives.]

The large island of Rügen, which covers the city of Stralsund on the German mainland, complicates access to the city. Ships must pass through the northwestern straits or the southeast "Bodden" to reach the city. The islands of Usedom and Wollin obstruct the mouth of the Oder River as it flows into the Baltic Sea. The Oder River connects to important German cities like Küstrin (today's Kostrzyn nad Odrą) and Berlin. (Map: The author, based on Google Maps.)

Stralsund

Control of the Inner Waterways

During the Great Northern War, the strongly fortified city of Stralsund on the southern coast of the Baltic Sea came into focus for several years. Stralsund is an ancient city in Western Pomerania, then a fief of the Holy Roman Empire, which came under Swedish control subsequent to the Thirty Years' War. After Sweden's main army was lost at the Battle of Poltava in 1709, Stralsund became one of the few places from which Sweden could launch a new army on the European continent. Thus, its defense became a key issue for King Charles XII.[5]

5 This paragraph is basically based on A. P. Tuxen and others (eds.), *Bidrag til den store nordiske krigs historie*, Volume VII (Copenhagen 1899–1934) ("Tuxen VII" below). See "A Comment on Sources" at the end of the paragraph.

In 1711, two years after the Swedish defeat at Poltava, Danes and Saxons marched on Stralsund, reinforced by Russians. Any besieger of Stralsund faced a significant logistical challenge: the main siege artillery had to be transported either by sea through the Baltic or via the Oder River from the south. The destiny of Stralsund would depend on the Swedish ability to reinforce and resupply the city versus the attackers' ability to either block Swedish transports to Stralsund or bring up siege artillery.

By its siting, Stralsund was difficult to access. Any ship bound for Stralsund had to enter either north or south of the large island Rügen. The surrounding inshore waters were shallow, making navigation hazardous and restricting passage to vessels no larger than a small frigate.

The Allied attack of 1711 failed, as would a few other attempts to conquer the city. The final siege began in 1715.

Stralsund 1715

In June 1715, Prussia also declared war on Sweden. Stralsund was now to be attacked by troops from Denmark, Saxony, Prussia, and Russia—nations allied against Sweden in the Great Northern War. Earlier that spring of 1715, a conference with Denmark, Prussia, and Hanover had decided that Stralsund would become Danish after a conquest[6] This decision strongly motivated the Danes to capture the city.

During the summer of 1715, a Danish army of 23,000 men and a Prussian army of 22,000 men marched up against the approximately 10,000 defenders. The siege began on June 13. Sweden maintained a flotilla of fifteen smaller ships in Stralsund. It was under the command of Admiral Michael Henck. As long as Henck retained control of the inner waters, the besiegers were unable to bring up their siege artillery. As long as the Swedish main fleet could control the southern part of the Baltic Sea and Henck could control the inner waters, Stralsund could be reinforced and resupplied.

In the Baltic Sea, only Sweden and Denmark possessed large navies. These

6 Nils Ahnlund and Jerker Rosén, *Den svenska utrikespolitikens historia 2.1 1697–1721* (Stockholm 1952), p. 101. [The History of Swedish Foreign Policy 2.1 1697–1721]

were relatively evenly matched, and none of the belligerents sought a decisive naval battle. Both fleets were not permanently at sea, and control over the Baltic Sea was relative. The Danes, however, fully understood the strategic importance of the inner waters for the conquest of Stralsund. The Danish court decided to "send everything that could float" to sea. Vice Admiral Christen Sehested was to organize an inshore flotilla that could defeat Henck. Soon, Sehested sailed from Copenhagen, escorted by the Danish main fleet. Unmolested by the Swedish main fleet, Sehested reached the Stralsund waters on July 17. On July 22, Henck and the Swedish Stralsund flotilla launched an assault on the Danish flotilla. The battle was fierce, but eventually, it was obvious that Henck could not defeat Sehested, and he withdrew.[7]

With Danish forces now dominating on the waters around Stralsund, the Swedish defense system began to crumble. Danish troops invaded and captured the island of Usedom on July 31. The Allies had now taken an important step in bringing siege artillery up the Oder River.

To the Swedish leadership, the severity of the situation was obvious. King Charles XII insisted that Stralsund be defended "at any cost." Stralsund was a key to further Swedish operations on the European continent. Swedish Commander-in-Chief of the Navy, Admiral Claes Sparre, was ordered to sea. On August 8, the fleets clashed off the island of Rügen. The Swedes deployed twenty ships of the line; the Danes brought twenty-four. The battle was fierce but tactically indecisive. Although neither side achieved a clear naval victory, the Swedish fleet withdrew for repairs following the engagement – allowing the Danes to claim a strategic success. The Swedish main fleet would not return to the Stralsund waters for the rest of the year[8].

The next Danish step was to enter the "Bodden" through its southern approach. This was not an uncomplicated undertaking. The waters were difficult to navigate, and the Swedish defenders had sunk ships to make the navigation even more difficult. A renegade Swedish pilot did, however, offer his services to Sehested. On September 16, Sehested began his advance into the Bodden. Nine

7 Tuxen VII, pp. 97–100.

8 Gunnar Unger, *Illustrerad svensk sjökrigshistoria, senare delen, omfattande tiden 1680–1814* (Stockholm 1923) [Ilustrated Swedish Naval History, the latter part for the period of 1680–1814], p. 70.

days later, he had sailed through the difficult passages and dispersed the remaining Swedish inshore flotilla. The success made him a full admiral.[9]

Now, the main siege artillery could be brought up. On October 19, the walls of Stralsund began to take the full onslaught. The end of Stralsund as a city under the Swedish Crown was now in sight. With the Danish main fleet at sea and the Swedish in harbor, there was no hope of resupplying Stralsund. Even if the Swedish main fleet had managed to defeat the Danish, Sehested's control of the inner waterways would make any reinforcement or resupply operation futile. The next decisive stage in the fall of Stralsund occurred on November 15, when 17,000 allied troops invaded and captured Rügen. The invasion was the largest amphibious operation during the Great Northern War.

For Sweden, Stralsund had become a fading hope. By December, the Allied siege artillery had shot a breach in the walls, and morale in Stralsund was falling dangerously low, as were supplies. The onset of winter threatened to freeze the water, which would allow enemy troops to launch coordinated assaults from multiple directions. For the Swedish forces, there was only one option. On December 27, the Swedes had surrendered.

Conclusions

The fall of Stralsund in 1715 illustrates the importance of fortress siting in relation to waterways. In this case, there was a marked duality in relation to waterways. Sweden relied on waterways to resupply the fortress, while the Allies depended on them to transport siege artillery.

The unique geography of Stralsund underscored the vital importance of controlling both the open sea and the inner waterways. Controlling the inner waterways was the key. Even if the attacker did not control the open sea, he could bring up siege artillery on the Oder River, and he could block Swedish resupply operations by controlling the inner waterways.

9 Tuxen VII, p. 161.

A note on sources

One of the most complete works on the sieges of Stralsund is found in A. P. Tuxen and others (eds.), *Bidrag til den store nordiske krigs historie* [Contributions to the History of the Great Northern War] (Copenhagen 1899–1934), in Danish. This work was published in ten volumes, and Volumes III, IV, and VII deal with Stralsund, where Volume VII treats the siege of 1715. Tuxen's work is the most detailed, drawing from various sources beyond just Danish ones.

In Swedish literature, Ludvig W:son Munthe's *Kongl. fortifikationens historia*, Part III:6 (Stockholm 1911) [The History of the Royal Corps of Fortification] is an important work for the siege of 1715. The description is quite brief but holds several references to primary sources.

Tobruk 1941

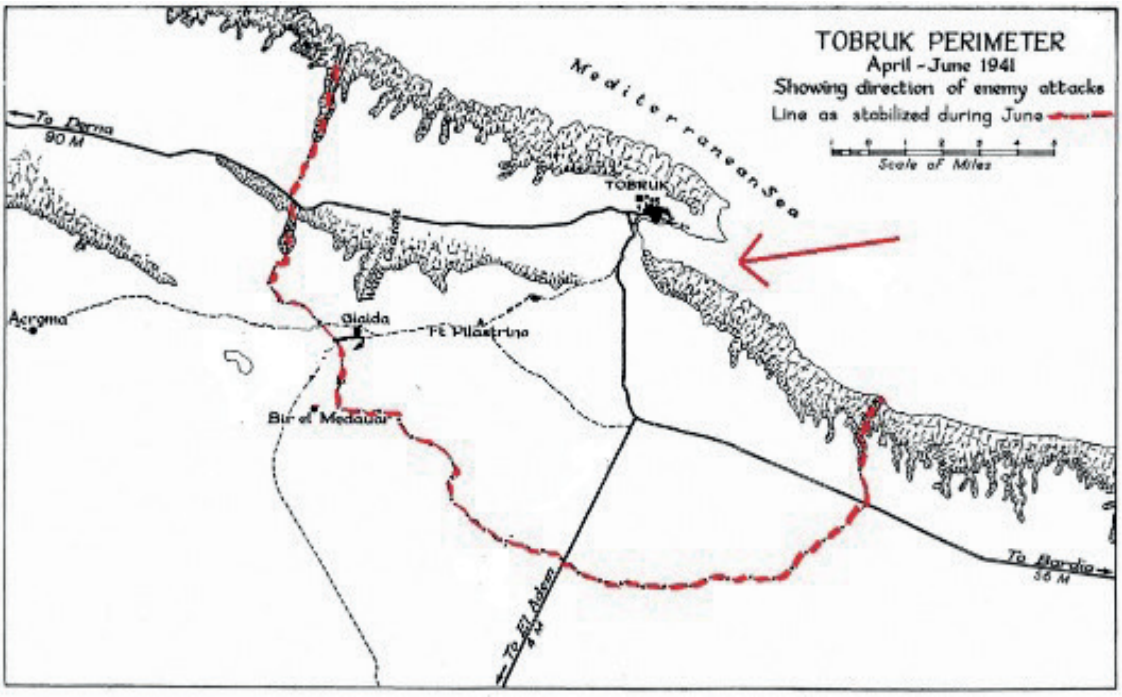
During the war in North Africa, Lieutenant General Erwin Rommel launched an offensive in the beginning of April 1941. In the midst of often chaotic fighting, Allied forces under the supreme command of General Sir Archibald Wavell, Commander-in-Chief, Middle East, were pushed back toward Egypt. As German and Italian troops advanced eastwards, Allied forces prepared to defend Tobruk, a city previously captured from the Italians. Tobruk is situated by the Mediterranean Sea and had been heavily fortified by the Italians.

By April 11, Axis forces had completely encircled the city, but, to quote British author Barrie Pitt, "Tobruk was fast hardening into a rock-solid enclave."

The Australian 9th Division formed the core of the defense, and, to quote Pitt again, they were "… grimly determined."

Axis attacks on the 14th, 16th, and 17th of April failed, with British artillery and Australian rifle fire halting the enemy advance approximately two and a half miles from the center of the city of Tobruk. Rommel's units pushed further east, and Tobruk became an enclave in enemy territory. General Wavell swiftly decided to defend Tobruk. [10]

10 Barrie Pitt, *The Crucible of War, I*, *Wavell's Command* (London 1986), pp. 265–272.



The map depicts the Allied perimeter around Tobruk in 1941. The map indicates that the entrance to the city was not army-blockable. It further indicates that there was no place from which the besieger could reach the discharge place with direct artillery fire. (Map: From I. S. O. Playfair, *History of the Second World War —The Mediterranean and Middle East* (London, 1956), Wikimedia Commons, edited.)

Resupply operations

Wavell now faced the challenge of resupplying approximately 35,000 soldiers and civilians trapped in Tobruk. With the city encircled by land and aircraft unable to carry sufficient loads, only seaborne resupply from Alexandria remained as an alternative. Responsibility for this task fell to Admiral Sir Andrew B. Cunningham, commander of the Royal Navy in the Mediterranean. Cunningham then made the senior naval officer of the Inshore Squadron, operating a naval force in support of the war on land, responsible for the resupply operations.

Initially, resupplying Tobruk did not appear to pose a major challenge. The Royal Navy maintained reasonable control of the Eastern Mediterranean. As

long as the Axis troops could not penetrate the perimeter, the entrance was not army-blockable. Indirect Axis artillery fire could reach the discharge places, but it could not be controlled and was therefore inefficient. It would, however, soon be obvious that enemy aircraft would prove far more disruptive to the resupply effort.

Nor was shipping capacity an immediate concern. The Royal Navy had several large transports at their disposal, which could carry the volumes of supplies called for. Rommel quickly recognized that starving Tobruk into submission was the only viable strategy in the short term. His primary tool for blocking Tobruk was light bombers, Ju 87 Stukas and Ju 88s.

During the month of April, the Allies dispatched seven freighters to Tobruk. While they managed to unload a significant portion of their cargo, German air attacks proved devastating: five of the freighters became total losses and one was damaged. The Axis offensive had forced the nearest Allied airbase back to Sidi Barrani, 120 miles from Tobruk, making sustained fighter cover over the city prohibitively costly[11]. It became obvious that it was not possible for large freighters to resupply Tobruk.

On May 7, 1941, Admiral Cunningham made the decision to supply Tobruk exclusively by schooner. To meet the critical need for petrol, a small tanker was scheduled to sail once a month during a moonless night. [12] Schooners proved insufficient, leading to the decision to utilize Landing Ships Tanks (LST) for bringing in supplies. The following decisions provide insight into the discharge problems. Two LSTs were to arrive each night, and six separate unloading places were to be prepared along the shoreline. [13]

German gunners could have eventually identified two unloading places and plotted indirect fire. By dispersing operations across six sites, the Allies significantly reduced the risk of disruption and damage during unloading.

However, the number of available LSTs was limited, and the vessels were prone to mechanical failures. As a result, the Allies occasionally utilized small freighters. When freighters had to be sent, they drew heavily on the RAF re-

11 Report on Operations, The National Archives (TNA), AIR 2/7462.

12 War Diary—Mediterranean, May 7, 1941, TNA, ADM 199/414.

13 Suggested plan for supplying Tobruk, May 22, 1941, TNA, WO 169/938.

sources. One small convoy sailing in July called for seventy fighters, flying in patrols of twelve. These patrols had been attacked by groups of thirty to forty enemy fighters. These were operations that the RAF could ill afford. It became increasingly clear that Tobruk had to be resupplied by methods that did not depend on continuous air cover.

Early in the siege, the defenders of Tobruk had relied on destroyers for urgent transport missions. Admiral Cunningham now made the difficult decision to employ several destroyers on the Tobruk run. [14] These were in short supply, but they were the only ships that were fast enough to approach the city in darkness, discharge, and leave the danger zone before sunrise.

The Luftwaffe still took its toll from destroyers and other vessels sailing for Tobruk, yet the Allies managed to bring in sufficient stores to sustain the garrison. In their ardent efforts to block Tobruk, the Axis powers employed the expected tactic of naval mining, but the Allied minesweepers maintained their superiority throughout the siege. An Axis effort to eliminate the Allied mine-sweeping force in Tobruk through aerial attacks was unsuccessful. In September 1941, the Germans sent U-boats to the Mediterranean. Although they succeeded in sinking a few ships, they were unable to upset the equilibrium. Sinking small ships on the shallow North African coastline was quite difficult.

On December 9, the siege was finally lifted. It had lasted for 242 days, and the resupply operations had, despite the efforts of the Axis powers, been kept up.

Conclusions

Modern times had added a new dimension to the issue of resupplying fortresses. Control of the sea became more complex due to the threat posed by aircraft to both men-of-war and transports. Thus, control of the sea also requires control of the air. In the case of Tobruk 1941, air power played out in a particularly nuanced way. Aircraft was a scarce resource for both sides. Keeping a constant air cover over Allied convoys was not viable. At the same time, the Axis side had limited capacity to maintain sustained bombing campaigns. An important factor was that Axis bombers found it difficult to hit small ships.

14 Compare Maintenance Tobruk, TNA, WO 169/949, item 30.

Ultimately, the Allies lost control of the sea during the day as sailing during these hours would lead to unsustainable losses.

During the dark hours, the Allies were still able to get enough ships through to Tobruk to sustain the garrison. The Axis powers had few remaining options to block the resupply of Tobruk. Mining the entrance was an expected tactic. The Axis powers sowed mines, but the Allies were equally good at sweeping them. The other tactic was to threaten the discharge by using indirect artillery fire. These efforts became a nuisance, but the inability to properly control the fire prevented it from becoming a real threat. Toward the end of the siege, the Germans diverted U-boats to the battle for the supply lines. Despite inflicting some losses on Allied shipping, they were unable to stop the supplies from entering Tobruk.

Tobruk ultimately fulfilled the key criteria for a fortress that could be resupplied during a siege. It was situated by the sea. The sea was not completely under the defender's control, but sufficiently so to bring supplies in. There was no army-blockable passage from the point of origin to the discharge place. While the discharge place lacked complete protection, it was sufficiently secure to facilitate discharge. These combined factors contributed to the Allies' ability to defend Tobruk until the siege was lifted in December 1941.

A note on sources

This paragraph is mainly based on *Re-supplying Tobruk in 1941*, an unpublished manuscript by Ulf Sundberg. The manuscript is based on the literature then at hand and extensive research in The National Archives (TNA) in the UK during 2007. Important sources at the TNA are "Report from the 9th Australian Division 1941" (WO 201/353), "The Quarter Master General in General Head Quarters Middle East — Diary" (WO 169/938), "Report on Operations" (AIR 2/7462), and "Inshore Squadron Report 1941" (ADM 199/799).

At the time, important literature was Frank Harrison, *Tobruk: The Great Siege Reassessed* (Arms and Armour Press, 1997); A. B. Palmer, *Pedlar Palmer of Tobruk* (Roebuck Society Publication No. 29, Canberra, 1981); and Anthony Heckstall-Smith, *Tobruk: The Story of a Siege* (Transworld Publishers, 1959).

The Swedish Baltic Empire, by 1700, was quite well protected by fortifications. The defense strategy involved fortresses holding an attacker until a relief army could reach the attack point. Sweden concentrated several fortresses on the vulnerable eastern border. Swedish possessions in the Holy Roman Empire (Germany) had their main cities strongly fortified. The southern parts of Sweden and the western coast were exposed to Danish attacks and also protected by fortresses. With the exception of the inlet to Stockholm, core Sweden was virtually void of fortifications in 1700. (Map: Samuel Svärd, edited.)

Epilogue

Fortress siting is an often-overlooked aspect of military planning, not least by the contemporary decision-makers. To take the Swedish Baltic Empire as an example: When the Great Northern War began in the year 1700, Sweden had approximately twenty-five fortifications of significance. Of these, five fortifications, Dorpat (today's Tartu), Koporie, Jama, Menzen, and Marienburg were located deep inland in the Swedish Baltic Provinces. Resupplying these by sea would then have been impossible, and they rapidly fell.

Swedish Ingria was protected by two fortresses: Nöteborg, at the eastern end of the Neva River, by Lake Ladoga, and Nyenskans, by the western end of the Neva River, by the Baltic Sea. The survival of Nöteborg depended heavily on Swedish control of Lake Ladoga, but this was quickly lost. A delta blocked the Nyenskans, making navigation difficult. Russian army forces swiftly captured these two fortresses.

Narva and its twin fortress of Ivangorod were also in Ingria, directly on the border with Swedish Estonia. Located up the army-blockable Narva River, these two fortresses were lost early in the war.

The fortified city of Reval (today's Tallinn) and the fortress of Arensburg on the island of Ösel (today's Saaremaa) also protected Swedish Estonia.

These fortresses did not have army-blockable entrances and also had reasonably good discharge places. They were also the last fortresses in the Swedish Baltic Provinces to fall. The fortified city of Pernau was another fortress in the Swedish Baltic Provinces. Its entrance was army-blockable. Its garrison was, however, all but annihilated by the plague, and its commander saw few alternatives to surrender when Russian forces arrived in the summer of 1710.

The strong fortified city of Riga and how the army-blockable Daugava River became its bane have been described above. The nearby fortress of Neumünde surrendered shortly after Riga. It did not suffer from an army-blockable entrance, but lacking a protected discharge place, it would have been difficult to resupply it under the eyes of the Russian army.

Finland was to be secured by the strong fortification of Viborg, which had stopped Russian advances since medieval times and had never been conquered. Viborg was a serious problem for any attacker in the barren landscape of eastern

Finland. However, attacking armies relied on maritime supply routes to maintain their siege operations, making control of the a sea decisive factor. The inferior Russian navy could resupply their siege army just after the breaking of the ice off Viborg, right before a Swedish flotilla reached the waters. Viborg's entrance was army-blockable, and the fortress could not be defended for long. It fell in 1710. Then, in 1710, Kexholm's old and insignificant fortification became isolated and also fell.

The Swedish possessions in Germany were heavily fortified. The city of Stade in Bremen-Verden was, however, sited far up an army-blockable river; the inlet to the city of Wismar was army-blockable; and Stettin (today's Szczecin) was sited down the Oder River and difficult to reach with resupply ships. The city of Stralsund has been described above. Therefore, it was in the long run impossible to defend these possessions.

Within Sweden's defense strategy at the time, it was hoped that enemies could be met and defeated outside the Swedish mainland, thereby minimizing the need for extensive fortifications within Sweden itself. Stockholm was, however, protected by a fortress by the inlet—the Vaxholm fortress. The southern provinces, captured from Denmark in 1658, were considered sensitive to Danish attacks. Strong fortifications in Malmö and Landskrona were to hold Scania. Malmö had a protected discharge place and did not have an army-blockable entrance. Thus, it could withstand long-term defense.

Landskrona lacked a protected discharge place, making it vulnerable to blockade and disruption during siege operations. Karlskrona, Swedens's main naval base, along with the small adjacent harbor of Karlshamn, underwent fortification.

It should be noted however, that the resupply of Swedish fortresses in southern Sweden depended on command of the Baltic Sea, which could be challenged by the strong Danish navy. During the Danish invasion of Scania in 1709–1710, several Scanian fortresses came under siege, but they were saved by a relief army before the resupply situation had to be tested.

Sweden also protected its western coast with fortifications. While Sweden aimed for control of the Baltic Sea, it lacked the resources to effectively contest Danish dominance on the western seaboard. Gothenburg was strongly fortified

and was supported by Nya Älvsborg [New Älvsborg] sited on an island off Gothenburg. Gothenburg never came under siege during the Great Northern War, but the smaller fortress of Karlsten, further up the coast from Gothenburg and sited on an island, was captured by a swift Danish attack at the end of the war. [15]

Conclusions

The cases of Riga and Stralsund clearly demonstrate how fortress siting had dire consequences for the Swedish Baltic Empire. The epilogue shows that these examples were not exceptions. As a rule, the Swedish fortresses in 1700–1721 were difficult to defend in the long run. The fortresses lost and their surrounding territories had to be ceded in the peace negotiations following the Great Northern War. The Battle of Poltava was a hard blow to the Swedish armed forces, but in total, more soldiers were lost in surrendering fortresses than at Poltava[16]. The surrendering fortresses also meant irrevocable losses of territory.

In contrast, the fortified city of Tobruk was successfully defended from April to December 1941, largely due to the fact that Tobruk was situated by sea, the defenders could maintain sufficient control of the sea, the entrance was not army-blockable, and the discharge places were safe enough.

Ultimately, fortress warfare is not only about walls. Siting becomes crucial if the fortress is strong enough to withstand coups and storming. Finally, one could ask why decision-makers over time have accepted fortresses sited in places that were obviously unsound from a resupply perspective. The most obvious answer is that the decision makers aimed to protect population centers. Control of the population centers could be considered control of the province or nation as a whole. Population centers also served as important economic hubs, necessitating protection.

Historically, cities were seldom established with a focus on military resupply operations. Placing a city somewhat inland gave advantages. A city sited inland was, for example, less exposed to harsh weather and raids by pirates. A city also depended on the road network, which most often did not follow the outer

15 This paragraph is based on Sundberg (2018), ibid.

16 Sundberg (2018), p. 373.

coastline. The decision-makers were then faced with a situation that, despite unfavorable resupply conditions, the city sat where it was at, and they had to fortify it. The matter was not of great import as long as a nation waged a successful offensive war, but when pressed into a defensive war, the costs could be high.

Scan from Johann Christoph Brotze's book *Sammlung verschiedner Liefländischer Monumente. Anmerkungen zum gegenüberstehenden Kupfer. Dieses Kupfer stellt die Bloquade der Stadt Riga durch die Polnischen Sächsischen Truppen Anno 1700 vor ...* [die Gravüre]. Wikimedia Commons.

Siege Warfare in East-Central Europe: Conquering and Defending Fortifications in Early Modern Transylvania (1551-1660)

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Introduction

Fortifications and sieges are rightfully regarded as fundamental aspects of early modern warfare in Europe. Building a fortress was a very costly and time consuming endeavour. The defence or conquest of a major defensive structure (fortress, fortified town, etc.) was likewise a costly and complex process, which was generally regarded as a defining moment in the course of any military conflict. There is also a strong connection between early modern military innovation and the particular field of siegecraft. The development of the *trace italienne* (bastioned fortification) as a reaction to the increased efficiency of artillery has been often labelled as a „revolutionary" change in armed conflicts, in Europe and beyond[1].

Nevertheless, it has been already argued that there were some significant

1 The Italian expedition of the French King Charles VIII (1494-1495) is generally accepted as a turning point in this process and has been often analyzed from this perspective by historians over the last several decades, Quentin Hughes, *Military Architecture* (London: Hugh Evelyn, 1974), 67-69; Jean-François Pernot, "La trace italienne, éléments d'approché," in *La Révolution militaire en Europe (XVe – XVIIIe siécle)*, ed. Jean Béranger (Paris: Economica, 1999), 31-37; Ciro Paoletti, A Military History of Italy (Westport: Praeger Security International, 2008), 12; Brian Sandberg, "French military revolution," in *Global Military Transformations: Change and Continuity*, ed. Jeremy Black (Roma: Nadir Media, 2023), 118-120; Geoffrey Parker has emphasized the role of bastioned fortifications in the „military revolution" debate, Geoffrey Parker, "Military Revolution", 1560-1660—A Myth?," *The Journal of Modern History*, vol. 48, nr. 2 (1976): 195-214; Geoffrey Parker, "The Limits to Revolutions in Military Affairs: Maurice of Nassau, The Battle of Nieuwpoort (1600), and the Legacy," *The Journal of Military History*, vol. 71, nr. 2 (2007): 331-332.

differences in the dynamics of siege warfare between Western and Eastern Europe[2]. In addition, there is also a persistent imbalance in the quantity and quality of historical writing dealing with the evolution of warfare in the two parts of Europe, although significant progress has been made over the last few decades regarding the eastern half of the continent. Much of the research has been focused on the large and influential polities of the region like Muscovy or the Polish-Lithuanian Commonwealth, underlining the specific military organization of these states[3]. A particular attention has been given to the transfer of military knowledge and technology signalling the long time needed for the adaptation of certain innovations, like the introduction of bastioned artillery fortifications in Muscovy during the 1630s-1650s under the influence of Dutch military architects[4]. However, not all military change was brought by external influences. While gunpowder weapons, and in particular siege artillery, were already a decisive factor in the outcome of sieges by the end of the fifteenth century, Muscovy and its neighbours developed a new type of fortification able to withstand the increased fire power of cannons. Sharing some basic similarities with the *trace italienne*, the Muscovite *gorodnya*, constructed with a mixture of wood, earth and stone, represented a local solution to the same challenge[5].

A combination of foreign influences and local solutions was implemented along the Habsburg-Ottoman frontier in Hungary and Croatia. The Habsburgs invested vast amounts of resources in building a fortified border stretching from

2 Jeremy Black, *European Warfare, 1494-1660* (London: Routledge, 2002), 47.

3 Some of the most meaningful contributions to the understanding of war and society in these parts of Europe, especially from the perspective of the Polish-Lithuanian Commonwealth have been made by Robert Frost in some of his seminal works like, Robert Frost, *After the Deluge. Poland-Lithuania and the Second Northern War 1655-1660* (Cambridge: Cambridge University Press, 1993); Robert I. Frost, *The Northern Wars: War, State and Society in Northeastern Europe, 1558–1721* (London: Routledge, 2000); Robert I. Frost, "The Polish-Lithuanian Commonwealth and the Military Revolution," in *Poland and Europe: Historical Dimensions Selected Essays from the Fiftieth Anniversary International Congress of the Polish Institute of Arts and Sciences of America*, ed. James S. Pula and Marian B. Biskupski (Columbia University Press, 1994), 19-47.

4 Brian Davies, "Introduction," in Warfare in Eastern Europe, 1500-1800, ed. Brian Davies (Leiden: Brill, 2012), 7.

5 Vladimir Shirogorov, "Quo Vadis? The Military Revolution in Eastern Europe. First circle, from the middle of the 15th to the beginning of the 17th centuries" in *Global Military Transformations: Change and Continuity*, ed. Jeremy Black (Roma: Nadir Media, 2023), 309.

the Adriatic Sea to the Carpathian Mountains to oppose the expansion of the Ottomans. Throughout the sixteenth and seventeenth centuries, many Italian architects and engineers were employed to build new bastioned fortifications or to improve the defensive capacity of older medieval stone castles. Smaller fortifications made of wood and earth, known as *palanka*, had an important role in reducing the negative impact of the frequent raids organized by Turkish frontier troops[6]. Throughout the sixteenth century and in the seventeenth century until the failed siege of Vienna in 1683, Habsburg-Ottoman confrontations were dominated by sieges and frontier skirmishes. Initially, the Ottomans were mostly successful in capturing enemy fortifications, through short sieges usually lasting less than twenty days. Nevertheless, the Habsburg strategy was successful on the long run by containing the Ottoman expansion in this frontier area[7].

Less research has been done on the military history of smaller states, especially in the eastern half of Europe. What was the defensive strategy of lesser polities in this region? How did they organize their frontiers and how effective were they in defending and conquering fortifications? The aim of this article is to offer some preliminary answers to these questions by looking at the particular case of the Principality of Transylvania, a vassal state of the Ottoman Empire emerged in the aftermath of the division of the Hungarian Kingdom in the middle of the sixteenth century. First we will analyse the defensive system of the principality and the importance of bastioned (*trace italienne*) fortifications in the management of frontier defence. Another important objective is to assess the effectiveness of the Transylvanian armies in siege warfare, both as besiegers and besieged, by identifying quantitative data regarding some of the most important sieges form 1551 (the first Ottoman siege of Timişoara) to 1660 (the Ottoman conquest of Oradea fortress): the duration of sieges, number of artil-

6 Géza Pálffy, "The Origins and Development of the Border Defence System against the Ottoman Empire in Hungary (Up to the Early Eighteenth Century)," in *Ottomans, Hungarians and Habsburgs in Central Europe: The Military Confines in the Era of Ottoman Conquest*, ed. Géza Dávid and Pál Fodor (Leiden: Brill, 2000), 3-71; Christopher Duffy, *Siege Warfare: The Fortress in the Early Modern World 1494-1660* (London: Routledge & Kegan Paul, 1979), 199-204.

7 Gábor Ágoston, "Behind the Turkish war machine: gunpowder technology and war industry in the Ottoman Empire, 1450–1700," in *The Heirs of Archimedes: Science and the Art of War through the Age of Enlightenment*, ed. Brett D. Steele and Tamera Dorland (Cambridge Massachusetts: MIT Press, 2005), 102-133.

lery pieces employed by both sides, size of the armies involved in these military operations, etc. Another important aspect of our research is represented by siege techniques and their rate of success.

Fortifications and frontier management in the Principality of Transylvania

Many territorial boundaries in early modern Europe can be defined as military frontiers, marked by more or less extensive networks of fortified structures[8]. This was also the case in Central and South-Eastern Europe, where the organization of frontiers was influenced by the Ottoman expansion in the region[9]. As a voivodeship of the Hungarian Kingdom, Transylvania was considered a frontier province and its defence was a constant concern for the medieval kings of the Realm of Saint Stephen. Its defensive capacity was consolidated through military colonisations, namely the settlement of Saxons (German and other Western European colonists) and Szeklers (originally a distinct tribe which accompanied the Hungarians during their migration in Europe) along the Carpathian mountain range, in the Sothern and Eastern part of the province. Another strategy, employed especially after the Great Mongol Invasion of 1241 was the building of stone fortifications[10]. When Transylvania was separated from the rest of the Hungarian Kingdom and became a distinct state in the middle of the sixteenth century, the focus of the defensive policy shifted form the Southern and Eastern boundaries to the newly established and highly disputed western frontier, which separated Transylvania from Habsburg Hungary and the Ottoman Empire. Although they were officially vassals of the Ottoman sultan, some Transylvanian rulers sided occasionally with the Habsburgs, exposing thus the western regions of their small state to Ottoman aggression as well.

8 Reingard Esser, Steven G. Ellis, "Introduction: Border Regions in early Modern Europe," in *Frontier and Border Regions in Early Modern Europe*, ed. Reingard Esser and Steven G. Ellis (Hanover: Wehrhahn Verlag, 2013), 7-17.

9 One of the most recent contribution to this particular subject is, Florin Nicolae Ardelean, Liviu Cîmpeanu, Gelu Fodor, Livia Magina, eds., *From Medieval Frontiers to Early Modern Borders in Central and South-Eastern Europe* (Berlin: Peter Lang, 2022).

10 Adrian A. Rusu, *Castelarea carpatică: Fortificațiile* și *cetățile din Transilvania* și *teritoriile* învecinate *(sec. XIII-XIV)* (Cluj Napoca: Editura Mega, 2005), 295-312.

The political survival of the new state depended, to a certain degree, on its military capacity. All those who ruled Transylvania and the other Eastern Hungarian counties who submitted to the authority of King John Szapolyai (1526-1540) and his heirs (Isabella Jagiello and John Sigismund Szapolyai) invested a significant amount of resources in building a strengthening the defensive system of the country, especially along its western frontier. By the end of John Sigismund Szapolyai's reign, the separation of Transylvania from the rest of the Hungarian Kingdom was further enforced through the peace treaty of Speyer (1570-1571). At this point, the principality had already developed a complex network of fortifications which were divided, according to some contemporary observers, in three categories: *castrum* – referring mostly to the older stone medieval fortresses, *fortalitia* – designating the smaller fortifications often built with wood and earth, and *arx* – the modern, bastioned fortress[11]. The new trend in military architecture (the *trace italienne*) had reached Transylvania without a significant delay and even before the middle of the sixteenth century several construction projects were already underway. The arrival of Italian military architects and engineers was considered a noteworthy event and sources mention many names of experienced professionals who had acquired some experience in their craft at home or in the service of other Central European states: Alessandro Clippa, Alessandro da Urbino, Sigismondo da Pratovecchio, Felice da Pisa, Ottavio Baldigara, Antonio da Bufalo, Andrea da Treviso, Francesco and Simone da Pozzo, Alessandro Cavalli, Paolo da Mirandola, Ottavio Baldigara, Simone Genga etc. By the end of the sixteenth century at least 15 fortresses or fortified towns had been enforced with bastions or in some cases entirely built following the principles of the *trace italienne*[12].

Between 1551 and 1556 Transylvania was temporarily controlled by the Habsburgs. During this brief period, the new authorities invested a significant amount of resources in strengthening the defensive capacity of the province. The army of General Giovanni Battista Castaldo was initially accompanied by two Italian architects, Alessandro da Urbino and Sigismundo da Pratovec-

11 Sándor Szilágyi, ed., *Monumenta Comitialia Regni Transylvaniae*, vol. II (Budapest: Magyar Tudományos Akad. Könyvkiadó Hivatala, 1876), 478.

12 Klára Kovács, "Fortresses-Building in 16th-Century Transylvania. The Recruitment of Labour Force," *Transylvanian Review* XXI, no. 2 (2012): 163-181.

chio of Pisa. While the first one was assigned to oversee the modernization of some important urban settlements from the hinterland (Alba Iulia, Sibiu and Sebeș), the second one was sent to strengthen the defences of strongholds in the south-western sector of the frontier, like Timișoara and Lipova. Although the Ottoman attacks on the south-western frontier obstructed any significant improvements of the defensive system, the construction projects in the other regions were more successful. In addition, the Habsburgs also brought a few thousand craftsmen and labourers from Bohemia (*operarios Bohemos*) who were settled in the southern parts of Transylvania to work on the construction sites from that area[13]. A similar initiative was the organization of the first modern arsenal in Sibiu, where large quantities of weapons, gunpowder and construction materials and tools were stored. Some of the workforce was recruited locally, but there were also many German and Italian craftsmen who had arrived with the army of Castaldo[14].

After Transylvania returned under Ottoman suzerainty in 1556, the rulers of the principality continued to develop the defensive system through the employment of foreign specialists. In 1568, John Sigismund Szapolyai initiated the construction of Oradea fortress, which became in time the centrepiece of the western frontier of Transylvania. This was a long process lasting more than five decades, until 1627 when the last bastion was finished during the reign of Prince Gabriel Bethlen (1613-1629). One of the most important architects who contributed to this major project was the Italian Ottavio Baldigara who was initially employed by Stephen Báthory in 1578 and then resumed his work few years later, in 1583-1584, under Sigismund Báthory. Before coming to Transylvania, Baldigara worked for the Habsburgs in Upper Hungary. While he was in the service of the Báthory family he also supervised several construction sites in

13 Florin Nicolae Ardelean, "On the Foreign Mercenaries and Early Modern Military Innovations in East Central Europe. The Army Castaldo in Transylvania and the Banat 1551–1553," in *Mozgó Frontvonalak. Háború* és *diplomácia a várháborúk időszakában 1552–1568*, ed. György Bujdosné Pap, Ingrid Fejér, and Ágota H. Szilasi (Eger: Dobó István Vármúzeum, 2017), 117-128; Kovács, "Fortresses-Building," 165-167.

14 Liviu Cîmpeanu, "The Royal Habsburg Arsenal in Sibiu (Hermannstadt, Nagyszeben) Under the Rule of Queen Isabella," in *Isabella Jagiellon Queen of Hungary (1539–1559)*, ed. Ágnes Máté and Teréz Oborni (Budapest: Akadémia Kiadó, 2020), 257-273.

the Polish-Lithuanian Commonwealth[15].

In the second half of the seventeenth century, although the Principality of Transylvania had reached its „golden age", there was a strategic shift in frontier management. With the exception of Săcuieni (Székelyhíd) fortress, built in the 1630s and 1640s[16], there were no other major construction projects initiated in this period. Instead, the ruling princes focused on strengthening the existing fortresses and on providing them with weapons, gunpowder and provisions. The western frontier continued to be rightfully regarded as the most sensible area and local resources and taxes collected from the whole country were directed in this region. For example, in 1624, the Transylvanian Diet voted a general tax of one florin for each *porta* (a fiscal unit consisting of a variable number of households) for the maintenance work done on the fortifications of Lugoj on the south-western frontier. All counties, seats and districts contributed to this effort, with the exception of Bihor County, whose inhabitants were paying a similar contribution for the fortress of Oradea[17]. Similar extraordinary taxes were demanded occasionally for the maintenance of other western fortifications like Ineu or Caransabeș[18].

Gabriel Bethlen (1613-1629) and George Rákóczi I (1630-1648) opted for an aggressive policy towards the Habsburgs in the context of the Thirty Years War and in doing so they managed to temporarily expand their political control in the eastern parts of the Hungarian Kingdom. At the end of his first expedition (1619-1621), Bethlen obtained a favourable peace treaty with the Habsburgs at Mikulov (Nikolsburg) and was granted control over seven counties in Upper Hungary (Szabolcs, Szatmár, Ugocsa, Bereg, Zemplén, Borsod and Abaúj). The

15 When he left Transylvania in 1584 Baldigara was rewarded with a golden necklace worth 300 florins, 500 florins in coin, a horse estimated at 100 florins, 40 marten furs and a golden cup, Andrei Veress, ed., *Documente privitoare la istoria Ardealului, Moldovei şi* Ţării *Româneşti, Acte şi scrisori*, vol. II (Bucureşti: Cartea Românească, 1930), 324; Florina Ciure, *Relaţiile dintre Veneţia* şi *Transilvania în secolele XVI–XVII* (Brăila and Oradea: Istros and Editura Muzeului Ţării Crişurilor, 2013), 257-260.

16 Liviu Borcea, "Contribuţii la istoria cetăţii Săcuieni (comitatul Bihor) în secolele XV-XVII," *Anuarul Institutului de Istorie şi Arheologie din Cluj-Napoca*, 26 (1983-1984), 319-332.

17 Szilágyi, *Monumenta*, vol. VIII, 233.

18 Florin Nicolae Ardelean, *The Army of Transylvania: War and Military Organization from the 'Golden Age' of the Principality to the Habsburg Conquest* (Warwick: Helion & Company, 2024), 77-78.

following military campaigns were concluded with similar agreements and for several decades, the Transylvanian princes benefited from the revenues of this rich region. In addition, the north-western section of the frontier was expanded and included several important fortifications, like Satu Mare (Szatmár) and Košice (Kassa). A bastioned fortress of timber and earth, Satu Mare was built between 1565 and 1573. In 1630, while it was under Transylvanian rule, the fortress was surrounded by a district of villages and market towns inhabited by 751 families of serfs, who provided contributions and workforce for its upkeep. The fortified town of Košice was even more important, holding one of the largest arsenals in the area[19].

Undoubtedly, the most important fortress of the principality was Oradea, positioned along one of the most important routes connecting the western borderland with the Transylvanian hinterland. Although the construction began in 1568 and lasted until 1627, the fortification was fully functional from the early stages of construction and successfully withstood a major Ottoman siege in 1598. After the defensive enceinte and the bastions were constructed, the authorities shifted the focus on consolidation works and on supplying the fortress with weapons, munitions and food supplies. According to an inventory drafted in 1632, the defenders of Oradea had 69 artillery pieces of various sizes, ranging from large cannons capable of firing 50 pounds projectiles and small falconets (1-4 pounds). All cannons were placed in the bastions or in the gate towers of the fortification. In addition, more than 500 portable firearms (both muskets and harquebuses), 14,859 artillery projectiles of various sizes and over 48 tonnes of gunpowder were stored inside the fortress[20].

Fortifications and their „human resources"

In the Principality of Transylvania many important fortifications were under the direct control of the ruler and were situated on the so called „fiscal estate" (crown lands). Each major fortress was surrounded by a district which included a certain number of settlements: Deva (1551) – 27 settlements com-

19 Ardelean, *The Army of Transylvania*, 85-87.

20 Paul Gyulai, "Inventarul cetății Oradea la 1632," *Acta Musei Napocensis*, X (1973), 665-673; Margit Nagy, *Várak, kastélyok, udvarházak, ahogy a régiek látták: XVII–XVIII. századi erdélyi* összeírások és *leltárak* (Bucureşti: Kriterion, 1973), 70-73.

prising 300 fiscal units, Gherla (1553) – 22 villages and one market town, Chioar (1566) – one market town and 66 villages, Şimleu (1594) – two market towns and 48 villages, Oradea (1600) – two market towns and 47 villages, etc[21]. The serfs living in these settlements provided taxes, food contributions and workforce for the immediate needs of the garrison and the administrative apparatus of the fortress and its surrounding estate. Of course, as we have seen in the previous section, these local resources were not enough to cover the expenses of major construction or consolidation works which required extraordinary contributions paid by the whole country.

Maintaining an appropriate number of defenders inside these fortifications was a complicated and costly matter. The upkeep of large mercenary garrisons was beyond the capacity of the Transylvanian treasury. In these conditions the prince and his councillors implemented a compromise strategy by keeping small mercenary garrisons inside the fortifications which could be supported in case of necessity by larger groups of semi-privileged peasant-soldiers living on the estate of the fortress. The resident garrisons represented a core of professional soldiers who received monthly wages and other benefits (clothes, food supplies etc.) for their service, but their numbers were usually kept below 100 men. For example, in 1550 Huszt fortress had a resident garrison of 64 men including the captain and his subordinate officers[22]. Around the same time (mid sixteenth century) Deva was defended by a mercenary garrison of 40 men (20 infantry, 20 cavalry)[23], Gherla had 70 permanent guards[24] and Şimleu had only 10 guardsmen on duty at all times, but in case of necessity they were joined by 113 free guardsmen and 19 free horsemen who lived in nearby villages[25]. The towns of the Transylvanian Saxons had permanent garrisons of similar size, usually

21 David Prodan, *Iobăgia în Transilvania în secolul al XVI-lea*, vol. II (Bucureşti: Editura Academiei, 1968), 136-780.

22 David Prodan, *Iobăgia în Transilvania în secolul al XVI-lea*, vol. I (Bucureşti: Editura Academiei, 1967), 502.

23 Magyar Tudományos Akadémia Könyvtára, Kézirattár, Budapest, Ms. 4178/3, Endre Veress, *Arcélek Erdély viharos multjából, Castaldo tábornok Erdélyben (1551–1553)*, f. 71.

24 Klára Kovács, *Cetatea din Gherla. Răspândirea fortificaţiei în sistem bastionar italian în Transilvani*a (PhD Thesis) (Cluj-Napoca: Babeş-Bolyai University, 2009), 42-57.

25 Magyar Nemzeti Levéltár Országos Levéltára (MNL OL), Urbaria et Conscriptiones, E 156 - a, Fasc. 113, No. 005, f. 1-90; Prodan, *Iobăgia*, vol. II, 596-599.

oscillating between 60 and 80 guardsmen, who kept regular watch at the gates and towers of the fortified enceinte[26]. In comparison, the Habsburg fortifications situated in the vicinity of the Transylvanian frontier were defended by considerably larger permanent forces[27]. In 1577, Satu Mare, the largest Habsburg stronghold east of the Tisa River, was defended by a garrison consisting of: 500 German infantry, 100 cavalry, 25 guardsmen (local infantry) and 32 gunners[28]. The Ottomans also kept slightly larger detachments of soldiers inside their border fortifications. The size of the garrison of Lipova, for example, oscillated between 120 and 221 men during 1554-1591[29].

The size of mercenary garrisons in Transylvania increased during the first half of the seventeenth century. Towards the end Gabriel Bethln's reign, in 1626, most fortified places from the inner regions of the principality had mixed garrisons (infantry and cavalry) of at least 100 men, while some of the larger structures exceeded this number (Alba Iulia – 600, Făgăraş – 200 etc.). In the western borderland, the number of paid soldier serving in fortifications was even higher, with all fortresses having at least 200 men, while Oradea had the largest garrison of 1,000 men[30]. It is estimated that Prince Bethlen spent around 150,000 florins each year with the upkeep of his garrisons while the overall military expenditure

26 Csaba Izsán, "Between Soldier and Guard: the Roles of the Town Mercenaries in the Late Sixteenth—Early Seventeenth Century Cluj (Klausenburg/Kolozsvár), Sighişoara (Schässburg/Segesvár) and Braşov (Kronstadt/Brassó)," in *From Medieval Frontiers to Early Modern Borders in Central and South-East Europe*, ed. Florin Nicolae Ardelean et al. (Peter Lang, 2022), 197-199.

27 The Habsburgs spent vast amounts of resources for the upkeep of large garrisons along the Ottoman frontier in Hungary. The main fortifications were defended by large forces of 1,000-1,500 men, medium-sized fortifications had garrisons of 400 to 600 men, and even the smaller wooden forts (*palanka*) had between 100 and 300 defenders; see Géza Pálffy, "The Habsburg Defense System in Hungary Against the Ottomans in the Sixteenth Century: A Catalyst of Military Development in Central Europe," in *Warfare in Eastern Europe, 1500–1800*, ed. Brian J. Davies (Brill, 2012), 45.

28 Adalbert Burai, "Despre cetatea de tip italian din Satu Mare," *Studii şi Comunicări. Satu Mare* I (1969): 142-143

29 Klára Hegyi, *A török hódoltság várai* és *várkatonasága*, vol. III (Budapest: História: MTA Történettudományi Intézete, 2007), 1447 – 1450.

30 Szilády Áron and Szilágyi Sándor eds., Török-Magyarkori Állam-Okmánytár **I.** *Török-Magyarkori történelmi emlékek. Okmánytár*, III (Pest: Eggenberger, 1868), 475; Ardelean, *The Army of Transylvania*, 75-76.

increased to 400,000 florins when the army was on campaign[31].

Although mercenary service was on the rise throughout this period, the princes of Transylvania continued to sustain the semi-privileged groups of peasant-soldiers who lived in the vicinity of major fortifications. This was a cost-effective solution for increasing the number of defenders in case of a major threat while maintaining the costs of regular wages to a minimum during times of peace. The largest recruitment pool for military service in the western borderlands of the principality was provided by the hajduks (*hajdús*). Initially cattle herders and traders, the hajduks increased in number as the Ottoman threat advanced in the Hungarian lowlands. In this context they became skilled in irregular warfare and responded in kind to the raids of Ottoman frontier irregulars. Some of them were employed in the garrisons of Hungarian and Transylvanian border fortifications but the large majority was hired occasionally for major campaigns[32]. Their numbers proliferated during the Long Turkish War (1593-1606) and in 1595 Prince Sigismund Báthory settled 4,000 hajduks in the vicinity of Lipova fortress which had been recently retaken from the Ottomans[33]. Several years later, in 1604, they joined Stephen Bocskay during his anti-Habsburg rebellion and were rewarded with a privileged status. In December 1605 the Transylvanian prince (and elected king of Hungary) issued a document for 9,254 hajduks who were allowed to settle in eight villages situated in Bihor County. They were exempted from all taxes in exchange for their obligation to defend the frontier and join the army of the prince during campaigns. A few other similar documents were issued latter for smaller groups of several hundred men[34].

Other individuals and communities in Transylvania enjoyed a similar status. They were not considered true nobles, but they enjoyed total or partial tax exemption in exchange for occasional military service in the fortifications of the principality. In contemporary sources they appear under various denominations

31 Dénes Harai, *Gabriel Bethlen: Prince de Transylvanie et roi* élu *de Hongrie (1580–1629)* (Paris:L'Harmattan, 2013), 202.

32 Florin Nicolae Ardelean, *On the Borderlands of Great Empires: Transylvanian Armies (1541–1613)* (Warwick: Helion & Company, 2022), 44-45.

33 Veress, Documente, vol. V, p. 23.

34 László Makkai, "István Bocskai's Insurrectionary Army," in *From Hunyadi to Rakoczi. War and Society in Late Medieval and Early Modern Hungary*, ed. Béla K. Király and János M. Bak (New York:Columbia University Press, 1982), 293.

such as guardsmen (*drabant/darabont*), harquebusiers (*pedites pixidari/sclopetari/ gyalogpuskások*) or freemen (*libertini*/*szabados*). They were serfs who had the obligation to keep weapons and to be ready to join the resident garrison of the nearby fortress and in exchange they were exempted from most taxes and work obligations[35].

Fortified camps and improvised field fortifications

In Transylvania, like in many other parts of Eastern Europe, the evolution of infantry was strongly influenced by siege warfare. The foot soldier had mainly a defensive role and his position on the battlefield was often associated with various forms of field fortifications (trenches, earth ramparts and wagon camps). Although historians still debate its origins, the fortified wagon camp was widely spread in the central and eastern parts of the continent since the later Middle Ages and continued to be employed with great success throughout the sixteenth and seventeenth centuries. In a way, it was an Eastern European alternative to the pike and shot tactics[36]. In fact, the use of *wagenburg* tactics influenced the development of a new type of infantry, the guardsmen (*trabant/drabant/darabont*) who were characterized by the use of firearms and the defence of fortresses and other improvised defensive structures on the battlefield[37].

It was quite common for the Transylvanians to fortify their camps while on campaign and especially while they were besieging major fortifications. During the early stages of a siege, the infantry (especially the levied footmen and conscripted peasants) were ordered to dig trenches around the perimeter of the besieged fortress and to build artillery platforms. The fortified camp was meant to ensure an efficient blockade and to protect the besieging army in case the enemies would receive help from outside.

Fortified wagon camps were used throughout the Seventeenth century, sometimes even during pitched battles. On 17 July 1603, Prince Moses Székely with

35 Ardelean, *On the Borderlands*, 46-48.

36 Shirogorov, "Quo Vadis?," 335-336.

37 Florin Nicolae Ardelean, "Frontiers and Military Organization in Transylvania: The Guardsman (Drabant/Darabont) During the Second Half of the Sixteenth Century," in *From Medieval Frontiers to Early Modern Borders in Central and South-Eastern Europe*, ed. Florin Nicolae Ardelean et al. (Peter Lang, 2022), 177–191.

an army of less than 12,000 confronted the slightly larger force (14,000 men) of Radu Șerban of Wallachia, near the town of Brașov. Faced with a larger enemy force but having superior artillery consisting of 25 field guns, the Transylvanian prince decided to take a defensive position inside a fortified camp of rectangular shape, made up of no less than 700 carriages and wagons. All the Transylvanian infantry and most of the dismounted cavalry took cover inside this fortified camp, while a large auxiliary detachment of Turkish and Tatar cavalry (5,000 men) waited outside this improvised field fortress. However, the Wallachian army took advantage of the divided forces of the enemy. They first routed the Turkish-Tatar cavalry and then overwhelmed the fortified camp with their light infantry[38]. In spite of this resounding failure, fortified wagon camps continued to be regarded as the best defensive solution for armies on campaign. A military regulation issued by Prince Gabriel Bethlen in 1616, stated that the wagons and carts used for the transportation of provisions and supplies had to be organized as a circular „defensive wall" around the tents of the soldiers to protect them against unexpected night attacks[39]. In July 1657, while the Transylvanian army was retreating from the Polish-Lithuanian Commonwealth, a fortified wagon camp was set up against a much larger Tatar army at Trembowla (Terebovila in Ukraine). Although the Transylvanian army was exhausted from several months of marching and fighting in hostile territory it was able to resist the initial assault of Tatar cavalry inside their improvised fortress. After four days of resistances the captain general of the Transylvanians was lured out of the camp under the pretext of negotiations and a small band of Wallachian mercenaries opened the way for the Tatar attackers[40].

38 Radu R. Rosetti, *Istoria artei militare a românilor până la mijlocul veacului al XVII-lea* (București: Corint, 2003), 349-353; Ardelean, *On the Borderlands*, 94-95.

39 Florin Nicolae Ardelean, "A "Town" on the Move: Regulating Camp Life and Logistics in the Army of the Principality of Transylvania (Seventeenth Century)," *Transylvanian Review*, XXXIV, Supplement No.2 (2025): 173.

40 János Kemény, "Ruina exercitus Transylvaniae," in *Kemény* János és *Bethlen Miklós művei - Magyar Remekírók*, ed. Éva V. Windisch (Budapest: Szépirodalmi Könyvkiadó, 1980), 314-321.

Besieged

The Ottomans did not hesitate to attack Transylvania when the rulers of the principality failed to fulfil their obligations as vassals, and especially when they sided with the Habsburgs in the process. The sultan was usually not satisfied with restoring order and changing the leadership in the principality in such situations. Repressive military expeditions targeted borderland territories and in particular major fortifications which were eventually conquered and included in the vast European defence system of the Ottomans. This was the political context for some of the most important sieges in which the Transylvanian army was on the defence, as we can see in Table 1, below.

Table 1:

Transylvanian/Eastern Hungarian fortifications besieged by enemy forces

Fortification and date of the siege	**Siege duration**	**Defenders**	**Attackers**	**Outcome**
Timişoara, 1-16 November 1551[41]	16 days	3,570 Habsburg mercenaries and local troops (2,020 cavalry and 1,550 infantry)	60,000 Ottoman troops led by Mehmed Sokollu (beglerbeg of Rumelia)	failed siege (the Ottomans retreated because of the bad weather and insufficient siege artillery)
Timişoara, 26 June -27 July 1552[42]	32 days	2,310 local troops and Habsburg mercenaries	50,0000 Ottoman troops and 36 siege cannons commanded by Kara Ahmed Pasha	successful siege (the defenders surrendered because there were no prospects of external help)

41 Petru Iambor, "Cucerirea Banatului de către turci şi transformarea lui în paşalâc (1552)," *Vilaietul Timişoarei (450 de ani de la* întemeierea *paşalâcului) 15*52-2002, ed. Doina Benea (Timişoara: Editura Mirton, 2002), 15-17; Károly Czimer, "Temesvár megvétele 1551-1552," I, Hadtörténelmi Közlemények, VI (1893), 15-71.

42 Károly Czimer, "Temesvár megvétele 1551-1552," III, *Hadtörténelmi Közlemények*, VI (1893), 308-376; Aurel Decei, *Istoria Imperiului Otoman* (Bucureşti: Editura Ştiinţifică şi Enciclopedică, 1978), 194-195.

Oradea, 25 September – 5 November 1598[43]	40 days	2,000 Habsburg and local mercenaries, 22 cannons of various calibres	20,000 Ottoman troops, 77 pieces of siege artillery	failed siege (the Ottomans retreated because of the bad weather and because of the casualties suffered during the siege)
Sibiu, January – May 1660[44]	almost 5 months	2,500 the town guards of Sibiu and the soldiers loyal to Prince Ákos Barcsay (Ottoman and Transylvanian soldiers)	8,000 soldiers (locals and foreign mercenaries) commanded by Prince George Rákóczi II	failed siege (George Rákóczi II retreated because an Ottoman relief force was approaching Sibiu)
Oradea, 14 July – 27 August[45]	46 days	850 soldiers and townsmen from Oradea	50,000 Ottoman troops	successful siege (the defenders surrendered because there was no relief army coming to aid them)

The most important Ottoman punitive expeditions targeted two major urban settlements in the western borderlands of Transylvania[46]: Timișoara in 1551 and 1552 and Oradea in 1598 and 1660. In both cases, the Transylvanians were able to resist the first siege but were forced to surrender during the second Ottoman attacks. In the middle of the sixteenth century, the defensive capacity of Timișo-

43 Ovidiu Cristea, "Castello Di Varadino Passo Principale Della Transilvania: Giovanni Marco Isolano's Relation on the Siege of Oradea (1598)," in *From Medieval Frontiers to Early Modern Borders in Central and South-Eastern Europe*, ed. Florin Nicolae Ardelean et al. (Berlin: Peter Lang, 2022), 295-310; Doru Marta, *Cetatea Oradiei: De la* începuturi *până sfârșitul secolului al XVII-lea* (Oradea: Muzeul Țării Crișurilor, 2013), p. 293-308; Beda Dudik, "Rödern Menyhért császári tábornagy tudósítasa Nagy-Várad 1598-iki ostromoltatásáról," *Történelmi tár* 1, no. 3 (1878): 106-116; Diana Iancu and Yusuf Heper, "Documente din arhivele turcești despre asediul Cetății Oradea – 1598," in *Patru decenii în slujba documentului*, ed. Mihai Georgiță, Augustin Țărău and Radu Milian (Oradea: Arca, 2017), 231-235.

44 Nicolae Bethlen, *Descrierea vieții sale de către el* însuși, trans. Francisc Pap (Cluj-Napoca: Casa Cărții de Știință, 2004), 90-91.

45 János B. Szabó, "Asedierea cetății Oradea de către tătari și turci 1658, 1660," in *„Oradea cum e ocrotită": Lupte pentru Oradea în epoca modernă timpurie. Studii despre istoria* Țării *Bihorului* 7, ed. Teréz Oborni (Oradea: Fundația Culturală Varadinum, 2020), 133-151; Ardelean, *The Army of Trans*ylvania, 129-132.

46 When referring to the political situation of the region in the middle of the sixteenth century, some historians prefer to use the expression Eastern Hungarian Kingdom to designate the emerging polity which will be later known as the Principality of Transylvania.

ara was increased by recent works of consolidation, but also by the marshland which surrounded this fortified town. The particular terrain conditions were an important factor during the first Ottoman failure in 1551. A rainy and cold autumn (the siege took place in November) which swelled the surrounding waters and the insufficient siege artillery of the Ottomans were two important factors which influenced the decision of the Ottomans to retreat after only 16 days of siege. In addition, the Transylvanians also sent the yearly tribute (one of their main obligation as vassals) to the Porte and therefore Mehmed Sokollu had enough reasons to retreat his army. Because the Habsburgs were unwilling to abandon Transylvania, the Ottomans launched a new and better prepared expedition against Timișoara in 1552. Learning from their past mistakes, they initiated operations in May and the siege took place in June and July, during a hot and dry summer which annulled the terrain advantage of the defenders. They also came well prepared for a prolonged siege with 36 large cannons and attacks from neighbouring Wallachia and Moldavia obstructed a major concentration of Habsburg and Transylvanian troops in Timișoara. This time, the Ottomans were able to efficiently encircle the fortification and their artillery was able to produce a major breach in the walls. Although vastly outnumbered (2,310 defenders vs. 50,000 besiegers), the defenders of Timișoara managed to resist for 32 days, but they eventually surrendered because there was no relief army coming to their aid.

Oradea was an even stronger fortification, with five Italian style bastions and a wide moat surrounding the enceinte. In 1598, during the Long Turkish War (1593-1606), a garrison of 2,000 local and Habsburg mercenaries was able to resist a 40 days siege performed by an army ten times larger and well equipped with siege artillery. Once again, the Ottomans decided to retreat because of weather conditions (the siege took place in September-November) but also because of the strong determination of the defending force which managed to repel several Ottoman assaults throughout this long siege. In 1660, the Ottomans conquered Oradea because the operations were carefully planned. This time the siege took place in summer (July-August) and the besieging army used a variety of siege techniques to diminish the resistance capacity of the defenders: sustained artillery fire from high ground, building mining galleries and a successful attempt to empty the moat of the fortress. The difference in manpower between

the two armies was even greater this time (850 defenders vs. 50,000 besiegers), but in spite of all these factors the Ottomans were unable to take the fortification by force. After 46 days of siege, the garrison surrendered after having lost more than half of their numbers and were allowed to retreat freely with their personal belongings.

The ability of Sibiu to resist for five months to a prolonged blockade in January-May 1660 and the other sieges discussed above indicate a high defensive capacity for Transylvanian fortifications during the sixteenth and seventeenth centuries. Well-equipped and supplied garrisons were able to resist one month or more even if they were vastly outnumbered by attackers. However, the outcome of a siege was also influenced by other factors such as terrain and weather conditions and especially by the presence or absence of a relief force.

Besiegers

The Transylvanian army was involved in far more sieges than pitched battles. In fact, sieges and frontier skirmishes were the dominant type of military encounters throughout the age of the principality (1541-1690). On many occasions, the Transylvanians participated in sieges as attackers: fighting in the hinterland of the principality against rebel factions (Gherla 1556 and Făgăraș 1573), conquering fortifications in neighbouring regions (during the 1595 campaign in Wallachia) or attempting to retake fortifications in the western borderland from the Ottomans (Lipova and Timișoara) and the Habsburgs (Satu Mare in 1644). The ten cases presented in Tabel 2 are just some of the most notable siege operations performed by the Transylvanian army from the middle of the sixteenth to the middle of the seventeenth century.

Table 2: Sieges performed by the Transylvanian army and their allies

Fortification and date of the siege	Siege duration	Defenders	Attackers	Outcome
Lipova, 4-24 Nov. 1551[47]	20 days	4,000 Ottoman soldiers commanded by Ulama Pasha	30, 000 soldiers from Transylvania, Eastern Hungary and Habsburgs mercenaries	successful siege (the Ottoman garrison surrendered and was allowed to leave the fortress)
Gherla, 8 March – 11 Nov.r 1556[48]	almost 8 months	400 mercenaries commanded by István Dobó	over 10,000 soldiers from Transylvania, Wallachia and Moldavia	successful siege (István Dobó surrendered because the Habsburgs were unable to send help)
Făgăraș, 30 September – 18 October 1573[49]	19 days	about 200 soldiers loyal to Gaspar Bekes	about 5,000 Transylvanian soldiers loyal to the elected prince Stephen Báthory and 22-24 siege canons	successful siege (the defenders surrendered because their leader was unable to secure the help of the Habsburgs)
Lipova, 21 august – 25 august 1595[50]	4 days	200 Ottoman soldiers	4,000 Transylvanian soldiers commanded by György Borbély	successful siege (defenders surrendered because they didn't receive help from nearby Ottoman fortifications)

47 Feneșan, Cristina, "Codex Vindobonensis Palatinus 7803, eine wenig bekannte quelle über die eroberung von Lipova durch die Habsburger (1551)," *Revue des Études Sud-Est Européennes*, XVIII:1 (1980): 14-25; Ardelean, *On the Bord*erlands, 69-70.

48 Georg Nussbächer ed., *Quellen zur geschichte der stadt Kronstadt*, vol. IV (Kronstadt: A. Gust, 1903), 518-529; Gheorghe Sebestyén, "Cetatea Gherlei. Cronologie (I)," *Studii* și *Materiale de Istorie Medie*, vol. XVI (1998): 217; Kovács, Cetatea *Gherla*, 52-53.

49 Lajos Szádeczky, *Fogaras vára* és *uradalma történeti emlékei* (Kolozsvár: Ajtai K. Albert Sajtója, 1892), 43-49; Ildikó Horn, *A hatalom pillérei: A politikai elit az Erdélyi Fejedelemség megszilárdulásának korszakában (1556–1588)*, (Budapest: ELTE BTK, 2012), 150-159; Teréz Oborni, "The artful diplomacy of István Báthory and the survival of the Principality of Transylvania (1571)," in *Frieden und Konfliktmanagement in interkulturellen Räumen: Das Osmanische Reich und die Habsburgermonarchie in der Frühen* Neuzeit, ed. Arno Strohmeyer and Norbert Spannenberger (Stuttgart: Franz Steiner Verlag, 2013), 87-92.

50 Liviu Cîmpeanu, "„Domnul fie lăudat [...] turcii au predat cetatea": Cucerirea Lipovei Otomane de către Transilvăneni în august 1595," *Historia* Urbana, XXVI (2018): 97-111.

Târgoviște (Wallachia), 6-8 October 1595[51]	3 days	1,000 Ottoman soldiers, 2 cannons and 44 falconets	50,000 soldiers representing the army of Transylvania, detachments form Wallachia, Moldavia and foreign mercenaries dispatched by the Habsburgs and the Grand Duke of Tuscany	successful siege (the fortification was taken after the wooden ramparts were set on fire and the attackers overwhelmed the defenders)
Giurgiu (Wallachia), 15-20 October 1595[52]	6 days	Ottoman garrison (unknown size)	50,000 soldiers representing the army of Transylvania, detachments form Wallachia, Moldavia and foreign mercenaries dispatched by the Habsburgs and the Grand Duke of Tuscany	successful siege (the defensive wall was breeched by artillery fire and was followed by a general assault of the besiegers)
Timişoara, 10 June -24 June 1596[53]	15 days	Ottoman garrison (unknown size)	40,000 soldiers of the Transylvanian army led by Prince Sigismund Báthory with 20 siege cannons	failed siege (the Transylvanian army retreated because a large Ottoman army was heading towards the fortress)
Timişoara, 16 October-26 November 1597[54]	42 days	2,000 Ottoman soldiers	20,000 Transylvanian soldiers	failed siege (the besiegers retreated because of the bad weather and the high rate of casualties)

51 Petre P.Panaitescu, *Mihai Viteazul* (București: Fundația Regele Carol I, 1936), 120-121; Andrei Veress, "Campania creştinilor în contra lui Sinan Paşa din 1595," *Academia Română. Memoriile secţiunii is*torice IV, no. 3 (1925): 87-91.

52 Panaitescu, *Mihai Viteazul*, 121; Veress, "Campania creştinilor," 90-91; Wolffgangi de Bethlen, *Historia de rebus Transsylv*anicis, vol. III (Cibinii: Typis et sumptibus Martinii Hochmeister, 1783), 623-628.

53 Forin Nicolae Ardelean, "The Siege of Timişoara from 1596 in the Works of Bernardino Beccari da Sacile," *Politics and society in Central and South-East Europe: life under the shadow of the Ottoman Empire's expansion (15th-16th cen*turies), ed. Zsuzsanna Kopeczny (Cluj-Napoca: Mega, 2021), 117-125.

54 Ion Sârbu, *Istoria lui Mihai Vodă-Vîteazul Domnul* Țării *Românești*, vol. I (București: Institutul de Arte Grafice „Carol Göbl", 1904), 479; Costin Feneşan, *Doi cronicari ardeleni din secolul al X*VII-lea, (Timişoara: Editura de Vest, 2001), 40.

Lipova, 1-12 June1616[55]	12 days	Rebel garrison (unknown size)	10,000 Transylvanian soldiers	successful siege (the garrison surrendered and was allowed seek refuge in Habsburg controlled territory)
Satu-Mare, February – March 1644[56]	30 days	1,000 Habsburg garrison of the fortress	8,000 Transylvanian soldiers	failed siege (the besieging army was ordered to abandon the siege and join the rest of the Transylvanian army in Hungary)

Unlike the Ottomans who had the manpower and resources to organize prolonged sieges, an army of a small state such as the Principality of Transylvania had to rely on speed to accomplish its goals. Most of the operations presented in Table 2 lasted less than one month and there are many other cases when smaller fortifications were taken by surprise night attacks or surrendered after just a few days. However, in 4 out of the 10 operations presented above, the Transylvanian army benefited from consistent help form her allies at the time, boosting the overall size of the besieging army to values comparable to that of the Ottomans, like for example the coalition army that marched into Wallachia in the autumn of 1595. With the exception of Târgoviște and Giurgiu which were taken by force, following major assaults of the besieging army, the majority of enemy garrisons (in 5 out of 7 the cases of successful sieges) surrendered because there was no relief force coming to their aid. The capacity to mobilize a relief force was indeed a decisive factor in the outcome of siege operations as demonstrated by the siege of Timișoara form June 1596, when Prince Sigismund Báthory decided to retreat precisely because he feared an encounter with an approaching Ottoman army.

The besieged fortresses inside Transylvania or in the western borderland were modern fortifications capable of resisting sustained artillery fire. Although some foreign observers claimed that the Transylvanians lacked the skill to use

55 Georg Kraus, *Cronica Transilvaniei 1608–1665*, ed. Gh. Duzinchevici and Eugen Reus-Mîrza (București: Editura Academiei Republicii Populare Române, 1965), 40; Feneșan, *Doi cr*onicari, 49; Ardelean, "A "Town" on the Move", 169-179.

56 Ioan Kemény, *Memorii (1607–1662)*, trans. Francisc Pap (Cluj-Napoca: Casa Cărții de Știință, 2002), 196-200; István Czigány, "The 1644–1645 Campaign of György Rákóczi I," in *The Princes of Transylvania in the Thirty Y*ears War, ed. Gábor Kármán (Paderborn: Brill Schöningh, 2022), 96-97.

artillery and fire arms in general, the rulers of the principality made constant efforts to compensate for this shortcoming by hiring foreign specialists. The artillery of Stephen Báthory, for example, was commanded by an Italian master gunner (*Raphael Cinna Florentinus*)[57] and Sigismund Báthory entrusted his artillery in 1595 to Silvio Piccolomini and the other Tuscan mercenaries who had joined his army[58]. In 1596, at the siege of Timișoara, the artillery of the Transylvanian army consisted of 20 siege pieces. In 6 days of sustained fire they were able to produce a breech in the wall but the assault was delayed because a mobile army of Tatars attacked the camp of the besiegers. By the time the Transylvanians dealt with the external threat, the Turkish garrison had built a wooden rampart behind the collapsed wall and repelled the general assault of the Transylvanian army[59].

Conclusion

Sieges were a frequent occurrence in the wars of Eastern and Central Europe throughout the sixteenth and seventeenth centuries. This was true for the military confrontations between major powers, such as the Ottomans and the Habsburgs, but also for smaller polities in the region, like the Principality of Transylvania. A small state such as Transylvania was very focused on the defence of its borders because its political survival depended on it. While the evolution of its cavalry was influenced by the necessities of irregular warfare in the frontier area, its native infantry developed in close connection to siege warfare, focused on firepower and static positions behind fortress walls or improvised field fortifications.

57 Sándor Szilágyi, ed., "Szamosközy István történeti maradványai 1566–1603," vol. II 1598–1599, in *Monumenta Hungariae Historica* 2, *Scriptores* 28 (Budapest: Magyar Tudományos Akadémia, 1876), 160.

58 Maria Holban, Maria Matilda Alexandrescu-Dersca Bulgaru, and Paul Cernovodeanu, eds., *Călători străini despre* Ţările *Române*, vol. III (București: Editura Științifică și Enciclopedică, 1971), 557-559.

59 Bernardino Beccari da Sacile alla Minerva, *Ragguaglio di tutto l'assedio di Temesvar Fino all levata del Serenissimo Prencipe di Transilvania da quella piazza, Dove s'intendono tre notabili fattioni di Sua Altezza contra i Turchi, et Tartari, Et in particolare la morte del Tartaro Cane pe mano dell'Altezza Sua, & l'acquisto delle sue bagaglie, & della preda che haveva fatta. Seguita a di 19.Giugno 1596* (Roma: Per Nicoló Mutii, 1596), 1-6.

Fortifications were a major concern for the prince and the other central institutions of the principality (Diet, princely council) but also for the local communities, especially in the borderlands. Although we lack accurate quantifiable data, historical sources seem to indicate that the construction and maintenance of fortresses represented one of the biggest „public expenditure" for the early modern Transylvanian state. Local resources provided by the fortress districts (estates) but also general taxes and work contributions were directed towards the building and upkeep of fortifications. Although the principality faced many internal political crises and an almost constant threat of being overwhelmed by one of its larger neighbours, there was a rather coherent policy in regards of frontier management. The second half of the sixteenth century represented a construction phase, strongly influenced by the presence of Italian architects and the spread of bastions, while the first half of the seventeenth century was a phase of consolidation, in which the focus shifted on strengthening the existing structures and on providing them with larger and well supplied garrisons. The functional system of fortifications was one of the reasons why the Principality of Transylvania was able to survive as a distinct state for one and a half century. The confrontations with the Habsburgs but also occasional wars with the Ottomans are a clear indication of the fact that Transylvania did not depend solely on the whims or good will of its imperial neighbours.

Fortification Variables in Western Eurasia and the Americas:

Intersection of Resources, Topography, Policy, and Results

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Introduction

Western scholars' investigations on seventeenth-century Western Eurasian fortifications and siegecraft concentrate on Western and Central Europe. Of equal significance is the lesser-known history of the Western Eurasian outliers and by extension the Americas. This investigation will focus on seventeenth-century Colonial Brazil and the hinterland Polish-Lithuanian Commonwealth (Rzeczpospolita), Ukraine, and Muscovite Russia.[1] Colonial Brazil figured prominently in stone-fortress construction in the seventeenth-century Americas, and competed with Spain for this distinction in Latin America.

Questions to be addressed are as follows. What communalities did the outliers share with core European countries and how did historical trajectories lead to differences in style for littoral and hinterland fortifications in the target regimes? How did topography, manpower and material resources, cultural patterns, and warfare intersect to produce outcomes? How did the European fortification intellectual centers, Italy, the Netherlands, and France, influence the outliers, and was there reverse stimulation in theoretical and applied military engineering?

Four inter-related themes are: (1) the strategic directions of the four polities, (2) fortification designs and their accommodations to the above-cited factors, (3) the siegecraft tactics of opponents, and (4) the competency of fortification builders as revealed in these structures' defensibility.

1 Other Western Eurasian polities include the Ottoman Empire and Sāfawid Persia.

At least four fortification styles existed in all four places: bastioned, angular thick-walled, medium- to high-walled stone fortresses; fortified towns with high walls and round or angular bastions; wooden fortifications with complexly-constructed walls and towers; and earthen fortifications. At times these overlapped. No one single 'model' prevailed and all four places' designers and constructors simultaneously innovated and standardized as they saw fit. Cross-temporal drifts, be they Ancient, Medieval, or Early Modern, and trans-national ones, be they Mediterranean, Northern European, Eastern Slavic, or New World and Siberian indigenous, made their mark on seventeenth-century fortification design.[2]

For comparative purposes this study will employ seventeenth-century France as a foil. French statism exhibited extraordinary sophistication in fortification design. French forts displayed great variety of interior structures and spaces beyond the fiscal and perhaps design capabilities of other Western Eurasian powers. Paris's funding dense fort networks to defend one city, for example, the port of Brest was nearly unmatched.[3]

The seventeenth-century French inherited much from earlier national tradition and from Italian designers. The innovation, massiveness, and intricacy of French design stand out, especially a fortress having three concentric rings of bastioned curtains. The complex bastion, counterguards, *orillon*, two-story flank, *tenailles*, *ravelin*, *caponier*, casements, enhanced embrasure, and *cunette* are but some examples.[4] Why the four outliers did not duplicate the French features was a matter of choice, perceptions of strategic threat, resource availability, and educational sophistication all reflecting both contingency and invariability. Seventeenth-century French fortification achievements were not a model for other polities so much as a conceivable goal. Colonial Brazil and France could hardly have been more dissimilar in the seventeenth century, yet each of them committed to similar fortification solutions, a telling example of

2 For pros and cons of fortifications *vis à vis* attackers and defenders, see J. Black, *Fortifications and Siegecraft. Defense and Attack Through the Ages* (Lanham, Maryland, 2018), xi-xx, 1-125.

3 J. Peter, *Vauban et Brest: une stratégie modèle de défense portuaire, 1683-1704* (Paris, 1998), 9-10, 38-39, 122-28, 153, 293-94.

4 J-D Lepage, *Vauban and the French Military Under Louis XIV. An Illustrated History of Fortifications and Strategies* (Jefferson, NC; London, 2010), 70-76, 79, 82-84, 87, 91, 99-103. For more features of late seventeenth-century French fortresses, see *ibid*., 60, 70, 72, 80, 88-90, 92-99, 105-10, 113-14.

an historical analogous phenomenon. Contemporaneous analysts bemoaned the inability of Eastern European governments to implement the Italian fortification school (*trace italienne*), but did this bias exhibit sound judgment?

Warfare kept French military constructionists busy, and this included *inter alia*: the Franco-Spanish War (1635-59) overlapping the Thirty Years' War (1618-48), War of Devolution (1667-68), the Dutch War (1672-78), War of the Reunions (1683-84), Nine Years' War (1688-97), and 'Prelude War' (1698-1701).[5] All of these conflicts dragged in at various times Spain, the Holy Roman Empire, the Dutch Republic, Genoa, England, Scotland, and Prussia.

European seventeenth-century information flow on fortification design, construction, defense, and siege was ubiquitous. The printing press, postal and other messenger structures, military mercenaries, battlefield experiences and observations, verbal communication, simultaneous innovations, and in general the Renaissance-driven quest for knowledge propelled the above-mentioned factors. A native speaker of Italian, French, Spanish, and Portuguese encountered few challenges in learning to read the military literature of the other. Italian- and French-language military literature dominated, although Spanish- and Portuguese-language contributions were substantial. The Romance- and Eastern European language gap hindered the three Western Eurasian outliers in acquiring broad and deep familiarity with the Romance-language specialty literature. Polish and Ukrainian military literature written in whatever language did not influence Western and Central European practices. Russian fortification experiences, as transmitted by European mercenaries and diplomats, likewise registered no impact in Europe. The sprinkling of seventeenth-century Russian-language literature remained within Muscovy. [6]

The four outliers' political and geographic circumstances varied. Muscovite Russia was an autocracy and bureaucratized polity. The *Rzeczpospolita* was a nobiliary, parliamentary state with a sub-standard central administration. Ukraine in the main consisted of two countries, one with shifting frontiers remaining under Polish and Habsburg control. The other, the Cossack Hetmanate (*Hetmanshchyna*), from mid-century constituted a military democracy with a

5 J. Lynn, *The Wars of Louis XIV 1667-1714* (Harlow, 1999), 10-11, 107-09, 113-57, 191-274.

6 S. Liutov and S. Dutov, *Stanovlenie voennogo knigoizdaniia v Rossii (xvii-xviii vv.* (Novosibirsk, 2010), 40-49.

fledgling governmental apparatus, albeit a country jaggedly descending into colonial status throughout waxing Russian overlordship. 1765 denouement brought outright absorption into Catherinean Russia. Brazil from the late 1400s was a Portuguese colony until 1822. All four were domains of hereditary unfree labor—serfdom and slavery of various kinds. Forced labor mattered in fortress construction.

All four devised their own fortification strategies. Challenges and constraints abounded. Muscovy was a northerly, landlocked country with soft frontiers to its north (the Arctic seas) and east (Siberia) and hard ones on the west (the Rzeczpospolita, Sweden) and on the south (Crimean Tatars, Ottoman Turks). Hard frontiers on almost all sides were the Rzeczpospolita's lot: Sweden, Muscovy, the Hetmanate, Crimean Tatars, Ottomans, and the potential threat of the Habsburg Empire. The Hetmanate was similarly encircled, minus Sweden. The Rzeczpospolitia, Ukraine, and Russia had minimally usable coastlines: the White Sea for Russia, a short Baltic stretch for Poland, and a problematically accessible Northern Black Sea shore for the Hetmanate. All four enjoyed riverine networks. Brazil stood apart with its enormous coastline simultaneously serving as lucrative, commercial soft frontier and hard frontier for Spanish and Dutch naval assault.

In comparison to France's compactness, the interior Western Eurasian space can be visualized as an inland sea with omnipresent archipelagoes of fortified cities and towns. None of the three realms and Brazil possessed the population base, the material resources, the elite's educational structure, nor the extensive military engineering base that France did. France's population was twenty million and Portugal's two million, while the Rzeczpospolita and Muscovy respectively numbered eleven and nine to ten million. The European and African population of Brazil in late-century might have numbered 600,000,[7] a high estimate—and far below France's size.

7 R. Simonsen, *História economica do Brasil 1500-1820* (2 vols., São Paulo, 1937), i, 135; Boxer, *O império marítimo Português*, 111-12; M. Linhares and F. Silva, *História da agricultura brasileira combates e controvérsias* (São Paulo, 1981), 144; Główny Urząd Statystyczny, *Historia Polski w liczbach. Państwo. Społeczeństwo. Tom 1*(Warsaw, 2003), 51.

Brazil

Colonized Brazil, for most of the seventeenth century, is best thought of as a coastal ribbon with short riverine routes into the interior. The Amazon's commercial expansion lay in future. With one exception Brazilian fortress emplacement was lateral with little or no fortress back-up for individual coastal towns. In most places a fortress defense-in-depth plan made no sense, since the jungle terrain of much of the littoral stymied deep penetration by opposing forces, thus precluding an attackers' blocking force. The poisonous snakes and other reptiles, along with repulsive insects and centipedes, themselves were a trans-Equatorial Brazilian fortress.

France's North Sea, Atlantic, and Mediterranean coastlines measured almost 1,600 kilometers, but Brazil's, from the Amazon to Uruguay stretched over five thousand kilometers.[8] France's northern frontier quadrant was the most densely fortified area in France and in Western Eurasia, Latin America, or the Caribbean. This quadrant stretched from Namur in its northeastern corner to Dieppe on France's northcentral coast and from Sedan in the southeastern corner to Dunkerque on the far northern coast of France.[9] Within this quadrilateral were a few score fortresses, many of which were no more than ten kilometers apart, creating high-density defense-in-depth with interlocking solid resistance points.[10]

Several factors guided Portugal's Brazilian construction program. They encompassed self-defense against predatory European nations, privateers, and pirates, and protected the slave trade and sugar mills.[11] Portugal with its population and resource base could never hope to duplicate the fortification scale of

8 National Geographic Maps, *Brazil Adventure Travel Map* (Evergreen, Colorado, 2011). Coastline distances were computed by measuring distances from one port to the next in straight-line fashion but also took into account coastal bulges and sharp protrusions augmenting maritime travel distance.

9 R. Gutiérrez and C. Esteras, *Territorio y fortificación. Vauban, Fernandez de Medrano, Ignacio Sala, y Felix Prosperi* (Madrid, 1991), 24; A.J.R. Russell-Wood, *The Portuguese Empire, 1415-1808: a World on the Move* (Baltimore, 1998), 60; Michelin, *France Nord* (Greenville, SC, 2019).

10 Lepage, *Vauban and the French Military*, 145, 170.

11 M. Fortes, 'A rede de fortificações na Amazônia brasileira: Uma abordagem sobre a militarização, séculos xvii e xviii', *Revista de Estudos Amazônicos* i (2000), 161.

its Latin competitors, France and Spain. From the early fifteenth century Portugal concentrated on fortress-building throughout its places of interest. Some of them were Eastern Atlantic island clusters, Morocco, western Sehel, Guinea-Bissau, São Tomé, Angola, Mozambique, Sri Lanka, Macau, Uruguay, and Brazil, the largest colony. The Portuguese built 244 fortifications outside the motherland before 1700.[12]

The Italian school and its numerous treatises stimulated Iberian academic and military interest in fortifications and the formation of educational institutions, for example, the Santo Antão College, Lisbon.[13] These incentives by no means compelled the Portuguese to rigidly follow Northern Italian plans, as if the Italians themselves were dogmatically committed to the *trace italienne*.[14] Shaping Brazilian fortress design was pragmatism, rooted in terrain assessment, engineering knowhow, savvy appraisal of potential foes' weaponry and tactics, deeper comprehension of gun powders and projectiles' potentialities, and expense. Solutions for the Piedmont and Tuscany were not congruent with Brazil's. There, different topography opened possibilities for redesigning curtains of unique flavor transcending the Italian innovations.[15] The Brazilian-Portuguese builders weighed environmental risk-management factors (flooding, high tides, hyper-vegetative growth) and were cognizant of subsidence, erosion, slope stability, dead weight, and structure stabilization.

Sixteenth- and seventeenth-centuries' Portuguese fortress builders were educated, abreast of Italian and French thinking, and spawned their own intellectuals, such as Luís Serrão Pimentel (1613-79), 'Portugal's Vauban', and Manuel de Azevado Fortes (1660-1749). The Santo Antão College, under Jesuit su-

12 M. Conceição, 'A fortificação no contexto da cultura arquitectónica portuguesa entre os séculos xvi e xvii: uma leitura geral', *História da Arquitetura Perspetivas Temáticas*, M. Rocha (ed.) (Porto, Portugal, 2018), 193-94, 197; J. Campos, 'The Pioneering Intercontinental Framework of Portuguese Fortification in the Expansion', *Defensive Architecture of the Mediterranean* xiii (2023), 450.

13 A. Sousa, 'Le modèle de construction italien dans le sud du Portugal et ses territoires d□outre-mer (1513-1621)', *Cahiers d□etudes italiennes* xxxi (2000), 1-11 (para. 27).

14 See photographs of eclectic Northern Italian fortresses in S. Pepper and N. Adams, *Firearms and Fortifications. Military Architecture and Siege Warfare In Sixteenth-Century Siena* (Chicago and London, 1986*), passim*.

15 Filipe Eduardo Moreau, *Arquitetura militar em Salvador da Bahía, s*éculos *xvi a xviii* (São Paulo: Intermeios, Casa de Artes e Livros, 2016), 208-09.

Fig. 1—Brazil. Forte do Reis Magos. Fortress. By city of Natal, in state (estado) of Rio Grande do Norte. Crédito obrigatório: Vlademir Alexandre/MTur. 2018. Public Domain on Flickr. Wikimedia Commons.

pervision and staffing since the 1590s, established the *Aula da Esfera* (Sphere Class), which taught mathematics and fortification. In 1647 Pimental formed an institute ('Class') of Fortification and Military Architecture at Santo Antão College. Two significant seventeenth-century fortification mathematicians and geometricians were Fernández de Medrano and Próspero de Verboom; they belong to the pantheon of Jean Errard, Antoine De Ville, Blaise De Pagan, and Vauban.[16]

16 M. Conceição and R. Araujo, 'Early Modern Fortification: the Portuguese Experience and Engineer Education', *The First World Empire*, A. Murteira and R. Jesus and H. Carvalhal (eds.) (New York, 2021), 37; A. Conde and M. Esteva, 'Teaching Engineers in the Seventeenth Century: European Influences in Portugal', *Engineering Studies* x, 2-3 (2018), 118; J. Domingues, 'What Mathematics for Portuguese Military Engineers? From the Class of Fortification to the Military Academy of Lisbon', *Beyond the Learned Academy: the Practice of Mathematics, 1600-1850*, P. Beeley and C. Hollings (eds.) (New York, 2024), 117; R. Gutiérrez and C. Esteras, *Territorio y Fortificacion. Vauban, Fernandez de Medrano, Ignacio Sala, y Felix Prosperi* (Madrid, 1991), 52, 62; Lepage,

Portuguese fortification publications sprung up. Most prominent was Pimental's capstone 1680 *Methodo Lusitanico de Desenhar as Fortificações das Praces Regulares & Irregulares.* It combined earlier geometric and trigonometric teachings, applied fortress construction knowledge, diagramming techniques, and Pimental's own theoretical insights to produce a standard pedagogical and reference work.[17] Portuguese fortification history up to 1700 proves that Portuguese fortification techniques and science were generative, not solely imitative.[18] In the 1500s there were spirited arguments over rammed earth, grass, wood, bricks, lime and mortar, and stone. Planners openly debated design options, most conspicuously for Salvador, Brazil's first capital.

Knowledge-acquisition, however, did not immediately translate into new construction technique. Not until the 1530s did the movement to the *trace italienne*'s non-round bastioned and polygonal shapes, shorter and recessed curtains, sharply angled flanks, and ditches in the Portuguese Empire appear.[19] One reason for this shift from Medieval-castle architecture was that high and narrow walls had tight parapets inhibiting artillery movement. Medieval recidivism in the form of retaining round towers and rounded bastions and square- and rectangular-shaped external walls survived. Constructed at ninety-degree angles in relation to one another these high 'Medieval castle-like' walls yet maintained a 'hold' on European military planners, including the Portuguese. Perhaps, architects of such fortresses gambled that the added elevation for greater range and arching trajectory for counter-battery fire to demolish the invaders' shipborne cannon was worth the rise of taller walls with an elevated height to thickness ratio.

Large, hostile landing parties were not the bane of most of Colonial Brazilian history. During Portuguese-Dutch hostilities, they were. One might puzzle at the number of Brazilian coastal fortresses with conventionally designed curtains

Vauban and the French Military, 65-72.

17 Conde and Massa-Esteva, 'Teaching Engineers', 120-26.

18 Conceião and Araujo, 'Early Modern Fortification', 36-41; Moreau, *Arquitetura military,* 48, 57, 62-63, 69-71, 176; M. Conceição, 'Hard to Translate: Lime and Earth Construction in Early Modern Portuguese Writings on Architecture and Fortification', in *Sculpture and Architecture (14th-17th Century)*, A. Brodini and C. Brodini (eds.) (Florence, 2020), 56-57, 60, 63.

19 Conceição, 'A fortificacão no contexto', 190, 192, 196; Moreau, *Arquitetura militar,* 45-46, 66.

and bastions, which design translated into dead zones about them. In the early seventeenth-century fortification rush the Portuguese did not have time to erect more elaborate structures. Also, the builders may have believed that a straight curtain maximized the quantity of artillery pieces to be brought to bear against hostile vessels, mimicking a man-of-war's broadside.

In such scenario the more stable land guns retained greater accuracy than the enemy's sea-based cannonry. Other clues offer further insight. The Forte dos Reis near Natal in Rio Grande do Norte sits on a sand spit, near the end of this peninsula's tip, and was cleverly designed. This trapezoid-shaped redoubt has one long curtain facing the ocean, an alignment supporting the shore-broadside speculation. On the side facing the spit's landward direction, there is an involuted curtain with two highly-angled, internal rounded corners, one sharper than the other. One corner has a sentient angle of 150º and other with a large rounded bastion; in between the two is a recessed area before the inner part of the curtain. This curtain was an excellent shot-trap to butcher any landing party, which might have made it ashore. Thinking that this side was the same as the ocean-facing one, the landing party was thereby lured into a trap. The versatility of the Portuguese designers is evident in this composite fortress' configuration. Forte dos Reis stands the *trace italienne* on its head. It was not designed for coastal warfare nor to thwart nomadic assaults nor, so it appears, to accommodate composite designs.

Not until the 1560s did the Portuguese become enthralled with the Italian school and that lasted for fifty years. Then, the French fortification school gained currency. The Colonial Brazilian authorities committed to coastal-oceanic and riverine-shoreline fortifications, and in the case of the former did so by systematically erecting and upgrading them from the late sixteenth century. Fortresses guarded many river debouches into the Atlantic, because these waterways sheltered the *engenhos* (the sugar-cane plantations) upon which the early Colonial Brazilian economy heavily relied.

Northeastern France's fortress density enormously exceeded Brazil's with the exception of Salvador. Seventeenth-century town populations were widely dispersed and tiny in relation to Western European counterparts. Fortresses in Brazil often preceded urban construction, which scheme resembled the Roman Army *castrae* in Northern Europe wherein the garrison strongpoint came first

and then the subsequent, interior commercial sector. Sometimes these elements advanced concurrently.[20]

Major coastal fortress towns were Bėlem, São Luís, Forteleza, Natal, João Pessoa, Recife, Salvador, Vitoria, Rio de Janeiro, São Paulo, and São Vicente. The median distance between these fortresses was 412 kilometers, the mean 380 kilometers, and the extremes were eight and 707 kilometers.[21] Terrain, distances, and people-paucity did not quell Lisbon's pretensions for subjugating its new landmass. In 1548 the capital demanded that every captaincy (*capitania*, province) must have fortresses, artillery, ammunition depots, and readily available men-at-arms for offensive and defensive responses.[22]

Brazil's foreign danger

Seventeenth-century Brazilian military preoccupations centered on French and Dutch corsair attacks, the all-out Portuguese-Dutch War (1598-1663) during most of which time Portugal belonged to Spain (1580-1640), and indigenous assaults away from the coast.[23] The 1590s and following decade drew sharpened concern to maritime defense and stone construction thanks to French and Dutch corsairs and privateers.[24] Constructing shoreline and estuary fortresses was obligatory. Early seventeenth-century Dutch men-of-war and armed merchant ships mounted forty-eight pounder, twenty-four pounder, and lesser cannons capable of pulverizing stone. Yet the higher-mounted Portuguese fortress cannon of similar calibers could outrange the Dutch.[25] Still, the history of Dutch penetration into Brazil shows that seaborne assault often overwhelmed the defenders in their shoreline stone redoubts.

The factors pushing Lisbon's fortress-building policy are straightforward. The incorporation of Portugal by Habsburg Spain in 1580 creating a union lasting sixty years brought Portugal and its colonial appendages into conflict with

20 Moreau, *Arquitetura militar*, 54, 58, 219.

21 *Brazil Adventure Travel Map*.

22 N. Sodré, *História militar do Brasil* (Rio de Janeiro, 1965), 19-20; A. Borelho and L.Reis, *Dicionário histórico Brasil. Colônia e Império* (3d ed., Belo Horizante, 2022), 32.

23 Sodré, *História militar*, 25.

24 Moreau, *Arquitetura militar*, 213, 238-39.

25 B. Groot, *Dutch Navies of the 80 Years' War 1568-1648* (Oxford, 2018), 35-36.

France and the Netherlands. Since the latter was waging its struggle for independence during the Eighty Years' War (1568-1648) against Spain, this event predetermined conflict between Portugal and the Netherlands. The latter on many occasions successfully assaulted Brazilian towns and fortresses from 1598 well into the 1600s, and demonstrated Dutch proficiency in conducting assault fleet actions.

The most dramatic encounters were the Dutch Wars from 1620 to 1640 witnessing Dutch maritime assaults along the Brazilian coastline. These took place most noticeably about the northeastern bulge where Pernambuco and its jutting provincial capital, Recife, lay and above all Salvador, further south. The intense Dutch assaults there in 1624 and 1625 overwhelmed the undermanned and dispirited defenders, their counter-bombardment evidently flaccid, and neither was there military nor supply relief.

The Dutch then undertook limited fortification construction in Salvador's cavernous Baía de Todos os Santos.[26] Dutch offensive vigor and stamina stood out. 1638 marks the second major Dutch thrust with heavy involvement of the Dutch East Indies Company. The Dutch fleet attacking Bahia Capitania and Salvador, mustered thirty-one men-of-war and 4,400 soldiers; two years later renewed assault within the Bay of All Saints threw twenty Dutch ships and 2,500 soldiers at their targets.[27]

Both Portugal and the Dutch United Provinces possessed formidable navies. Since Brazilian colonial government lacked the monetary resources, the manpower, and extensive quarries of seventeenth-century France, the authorities had to make do with constructing fortresses on select, oceanic shoreline points. Surveying preceded site excavation followed by stone-querying and transporting cut stone blocks by boat, ship, or towed barge to final destination. The quarry workers and stonemasons used chisels, wedges, hammers, saws, ropes and pulleys, and possibly other instruments. Labor force composition encompassed slave workers and hired hands with Africans, Indians, Europeans, mixed-race, and their descendants compelled, dragooned, or enticed to engage in fortress construction.

26 Moreau, *Arquitetura militar*, 253-63.

27 Moreau, *Arquitetura militar*, 267-69.

Salvador

The major fortress site was Salvador and adjacent territory, and was the apogee of early Brazilian fortification strategy. Salvador fortification building commenced in 1536[28] with heavy reliance upon rammed earth and wood. Only from 1600 to 1620 did the authorities commit to concerted stone fortress building. On smaller scale, the Salvador regional fortress complex resembled the northern French quadrangle. Salvador is situated on the Itapagipe Peninsula separating it from the Atlantic and the Bay of All Saints, extending over fifty kilometers into the interior and containing several score islands. Some were excellent fortress platforms, particularly big Ilha de Itaparica near the bay's mouth. In all of these places, there were at least thirty-five fortresses (*fortelezza*), forts (*forte*), small forts (*fortim*), and strongholds (*reduto*).[29]

Illustrations of the fortresses about Salvador and elsewhere in Brazil reveal the high state of Portuguese military engineering. Designers were free-ranging. Some fortifications had multi-angled polygonal shapes with as many as ten, even fourteen, curtains. Some fortifications were rectangular, trapezoidal, pentagonal, and square-shaped with star-like bastions sticking out at the corners. Salvador's Forte Castelo do Mar was a hexagon, and Recife's Forte de Santa Cruz do Mar was a nonagon. One Salvador fortress was circular with two concentric curtains, one inside the other and spaced equidistantly. The two circular curtains were non-perpendicularly angled to the ground; these features allowed for two levels of cannon ports and 360° coverage. In the Salvador region curtains were angled but sometimes perpendicular to the ground. Some bastions were round, while others had curtains converging at 75°, 120°, 135°, 150° for the sentient angles; some curtains were even arrow-shaped.[30]

The Portuguese and their Brazilian descendants did not corner the 'fortifi-

28 Moreau, *Arquitetura militar*, 114.

29 J. Campos, *Fortificações da Baía* (Rio de Janeiro, 1940), 215-16, 227, 233-35, 237-67, 276-77, 283, 287; J. Menezes and M. Rodrigues, *Fortificações portuguesas no Nordeste do Brasil: séculos xvi, xvii e xviii* (Recife, 1986), 43-44; M. Oliveira, *As fortificações portuguesas de Salvador quando Cabeça do Brasil* (Salvador, 2004), 176; Moreau, *Arquitetura militar*, 184-87, 213-34.

30 Menezes and Rodrigues, *Fortificações portuguesas*, 24, 30, 49, 58, 65, 73, 75, 90-91, 97, 100, 102-06, 108-10, 113-15, 121, 125, 130, 134-35, 138, 142, 144, 146, 148, 150, 152-55.

cation market'. Runaway slaves formed fortified military colonies (*quilombo*s, *mocambos*, *santidades)* in remote locations to deter slave-recapturing expeditions and individual slave-catchers. The fugitives' colonies were fashioned from earth and wood. The most spectacular colony was Palmares, lasting for almost a century, and protected by fencing and palisades. Palmares housed as many as 20,000 escapees and their descendants, finally succumbing to an artillery and infantry Brazilian-Portuguese expeditionary force, numbering one thousand, in 1696.[31]

Poland

Poland's seventeenth-century strategic dilemma was the massing strength of Sweden, Muscovy, the Ottoman Empire, and Bohdan Khmel'nits'kyi's Cossack forces against all of whom the Rzeczpospolita warred. The nettlesome problem of the Crimean Tatars persisted. The two most severe traumas were the 1655 Swedish invasion and the Ukrainian-Polish War from 1648 to 1654. The Rzeczpospolita's fortification policy, mostly a carry-over from the sixteenth century, confronted these predicaments and intensified the remedies. Despite systemic drawbacks, Warsaw in the early seventeenth century invested heavily in stone fortress-building in the Baltic. The capital directly and indirectly presided over expansion and reinforcement of town-wall fortification be it in stone or earth and wood.

The 1569 Lublin Treaty bound together the Polish Crown and the Grand Duchy of Lithuania (GDL) to form the Polish-Lithuanian Commonwealth. Poland now acquired much of Western and Eastern Ukraine, roughly one hundred percent Poland's size. Belarus remained under Vilnius's aegis as did ethnic Lithuania.[32] Poland now confronted formidable fortification challenges in

31 M. Neves, *Documentos sobre a escravidão no Brasil. Textos e documentos. 6* (São Paulo, 1996), vi, 121-25; A. Metcalf, *Go-Betweens and the Colonization of Brazil, 1500-1600* (Austin, 2005), 273; L. Figueiredo, *Rebeliões no Brasil Colõnia* (Rio de Janeiro, 2005), 34; P. Mesquita, 'Entre mucambos e mucamas: uma proposta para se pensar historicamente a cultura Afro-Brasileira', *Veredas da História* vii, 1 (2014), 122, 124; D Briskievicz, 'Um estudo sobre os quilombos da Vila do Príncipe, Minas Gerais, séculos xvii e xix', *História, histórias* x, 20, 66-67.

32 W. Czapliński and T. Ładogorski (eds.), *Atlas Historyczny Polski* (Warsaw, 1973), 20-21.

Ukraine and in reconsidering fortification options within Poland as adaptation to hot weaponry and the steppe threat intensified.

Several limitations confronted the Poles during the later sixteenth century in any attempt to systematically construct fortresses along Italian and French lines. These strictures hinged on the Poles' limited monarchy, in the process of becoming elective, and their fractious national parliament (*Sejm*) which mostly nobleman delegates remained antagonistic to the king, fearing perceived centralizing proclivities. The nobility saw fortresses as harbingers of absolutism. The Warsaw government chronically lacked sufficient funding for fortress building, a factor always to assess when visualizing quarry proximity, outcropping measurement, stone-cutting, stone-block removal, and transportation to site installation. Seventeenth-century Polish fortifications' condition remained unsatisfactory, and maintenance was a permanent worry.[33] Coerced labor, either mandatory government service or landlord labor draft for construction or maintenance, was a form of off-farm labor that unpredictably distorted the agricultural and perhaps town labor markets. Daily piece, waged-labor may have come into play.

Polish military doctrine in the sixteenth and seventeenth centuries did not emphasize permanent, defensive points. Poland's lack of major sixteenth-century conflicts for the first half of the sixteenth century lulled it, leading to a paucity of modern fortress construction and training in newer counter-siege techniques. Negligence in fortifying interior cities was significant. Polish fixation upon the *Rzeczpospolita*'s well-performing cavalry—to the neglect of new model infantry—impinged upon visualizing fortress active defense and layered fortress rings for husbanding horse and foot for eventual counter-offensives in the French style. The Poles did give serious attention to artillery, and Warsaw opened an engineering academy there in 1622-23. Polish monarchs Stefan Batory (1576-86) and Władysław IV (1632-48) avidly supported field and fortress artillery.[34] Władysław originated a methodical fortress-building plan, but the

33 R. Sikora, *Wojskowość Polska w dobie polsko-swedzkiej 1626-1629: kryzys mocarstwa* (Poznań, 2005), 119-20; J. Wimmer, *Wojsko polskie w drugiej połowie xvii wieku* (Oświęcim, 2nd ed., 2013), 315-16.

34 Paul Wlodkowski, 'Engineering of the Highest Caliber: Kazimierz Siemienowicz and the Culmination of the Military Revolution', *Studia Historiae Scientiarum* xxi (2022), 30, 32.

fractionating conduct of Poland's political system blocked it.[35]

A composite of competing and interwoven interests, the result of Poland's power-sharing and decentralized political environment, doomed any uniform fortification strategy. Public and private interests intertwined yet conflicted with one another in the Sejm and *sejmiki* (local diets) and with private magnates, large churches, monasteries, and royal, private, and ecclesiastical towns. Such structural, multiple-level decision-making and over-lapping competencies hindered unified fortress command. Sufficient economic delivery was lacking due to small population density averaging from ten to twelve and one-half people per square kilometer that restricted urbanization,[36] and no Colbert at the top. Such constraints forced the Sejm to delegate too much authority on fortification policy to the diets. Their delegates were ill-equipped to formulate national fortress policy.[37] Cumulatively, these problems denatured growth of compartmentalized, central administrative bodies specializing in military affairs, including fortress policy, unlike the remarkable Muscovite chancelleries (*prikazy*).

In southeastern Poland local inhabitants endured Crimean Tatar incursions and fashioned local ("small-town") urban perimeter defenses—obsolete by European standards. This 'southeastern factor' may have contributed to Polish fortification complacency, though this is not to deny that southeastern Poland housed numerous fortified towns and fortified magnate palaces.[38]

The walled, fortified city model of the Poles, is epitomized in the impressive reconstruction of the L'viv (Pol., Lwów) Fortress, re-engineered and rebuilt in the 1550s and 1560s. The singular city wall, an irregular trapezoid, totaled 1,700 meters, and its curtains were six to eight meters high and two meters thick. Situated among four-sided bastions, the curtains were up to 130 meters long. Towers were as high as fifty to sixty meters, and by 1643 there were twenty of them. Fronting and running parallel to the curtains on three sides was a low wall of rub-

35 B. Dybaś, *Fortece Rzeczypospolitej. Studium z dziejów budowy fortyfikacji stałych w państwie polsko-litewskim w xvii wieku* (Toruń, 2ed. rev., 2018), 178-82, 192.

36 Dybaś, *Fortece Rzeczypospolitej*, 112, 136, 154, 160; Chmiel, 'Znaczenie fortyfikacji stałych w działaniach wojennych w Koronie w 1648 roku', *Studia nad Staropolską. Sztuką Wojenną*, Z. Hundert and K. Żojdź and J. Sowa (eds.) (5 vols., Oświęcim, 2017), v:169; *Historia Polski w liczbach*, 51.

37 Dybaś, *Fortece Rzeczypospolitej*, 134, 163-64, 167; Chmiel, 'Znaczenie fortyfikacji', 167-68.

38 Sikora, *Wojskowość Polska*, 119-20; Wimmer, *Wojsko polskie*, 316.

ble, before which were two water-filled ditches 'twixt which was an earthen rampart. Formidable though the L'viv Fortress was, a combined Ukrainian-Russian assault from early October to early November 1655 induced Polish surrender. Both Russian artillery and devastation of surrounding villages, thereby eliminating Polish food-supply and undermining morale, were key factors.[39]

Since Central Poland had not been subject to major military distress for nearly two centuries before the 1560s, little rethinking of fortification doctrine had transpired. The Polish-Swedish War (1621-29) forced Warsaw to build fortresses across its limited Baltic shoreline from Gdańsk east into Royal Prussia. Bogusław Dybaś gingerly proposes a 'Gdańsk system', a whole series of fortifications of different types to the west and east and south of this port.[40] The Gdańsk system bears comparison to the fortress complexes of France's northern quadrant and in Salvador's Bay of All Saints.

Because of funding shortfalls, in 1655 several of the major cities of Poland and its subordinated territory Royal Prussia fell to the Swedes, who overwhelmed them without lengthy, if any, sieges. Other cities included Cracow, Gdańsk, Warsaw, Elbląg, Toruń. Their stone fortifications predominantly consisted of one major curtain interspersed with circular or angled bastions without any fallback, polygonal revetments. During the Polish counter-offensive from 1656 to 1660, Polish commanders frequently used bloody, storming tactics against Swedish-held Polish towns, instead of employing the measured, besieging tactics promoted in Western European military literature.[41]

Sometimes, the builders emplaced high towers in the walls as in Warsaw, Cracow, and Lublin that conveyed grandeur but translated into sub-optimal military utility. The staying capacity was not there. The above-detailed types of construction, along with some earthen and wooden elements, surfaced also in the southeastern city of Przemyśl, overrun by the Zaporizhian Cossacks in 1655.[42]

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39 E. Gorb and J. Ryabucha, *Lwów—Jezierna. Kampania kozacko-moskiewska roku 1655* (Inowrocław, 2019), 71-72, 83-95.

40 Dybaś, *Fortece Rzeczypospolitej*, 122-23, 149-52.

41 M. Paradowski, *Against the Deluge. Polish and Lithuanian Armies During the War Against Sweden 1655-1660* (Warwick, 2022), 290-93, 295, 297-98, 302-03, 305, 314.

42 Sikora, *Wojskowość Polska*, 119-20; J. Bogdanowski, 'Basteje ziemne Małopolski w świetle

There was noteworthy design carryover from the later Medieval period and the sixteenth century into the seventeenth. Large towns had fortifications of different types reflecting eclectic, temporal influences. Some towns had traditional or Medieval fortifications with high, thin walls and round turret-bastions, reflecting in part reluctance to reject Medieval practice.[43] Other towns had heavier, bastioned fortifications, often with four sides. These bastions were usually fashioned from earth with wooden-stake, anti-storming palisades circumventing them; on top of the bastions and coursing along the curtains were short, stone ramparts. This construction figured also in the Gdańsk fortress.

Aristocrats and lesser noblemen privately built and owned their own fortified wooden manors, sometimes on hilltops, and sometimes bastioned. There were also fortified churches and synagogues. Southwest of Warsaw the privately owned and short-statured Janowiec castle, encased by a non-bastioned stone-wall with numerous embrasures, fell to the Swedes in 1656. The south side of this complex had a weakly designed field of fire;[44] perhaps the Swedes took advantage of this, breeching the wall and surging through.

However commendable those investments made in stone fortresses, they fell quickly to the Swedes in their 1655 invasion of the Polish interior. Outright surrender took place frequently; some instances of resistance occurred such as the twenty-three day siege of Cracow.[45] Demoralization of the besieged civilians and soldiery was the main culprit, before the usual supply, nutritional, and sanitary deprivations set in. Morale more than stone mattered.

By no means were stone fortresses the sole defensive strategy, for the versatile Poles had a few varieties of field fortifications, reflecting the quick responsiveness incumbent upon Eastern European warfare. One was travelling camps

traktatu *Rei tormentariae*…(xv-xvi w.)', Marian Kloza (ed.), *Bastejowe fortyfikacje w Polsce* (Wrocław, 1975), 26, 28-30; J. Frazik, 'Niektóre umocnienia bastejowe w Polsce południowo-wschodniej', *Bastejowe fortyfikacje*, 73-76; J. Widawski, 'Modernizacja murów obronnych miast małopolskich spowodowana rozwojem broni pałnei', *Bastejowe fortyfikacje*, 160-62, 164, 166.

43 Dybaś, *Fortece Rzeczypospolitej*, 111.

44 Bogdanowski, 'Basteje ziemne Małopolski', 28-31; Sikora, *Wojskowość Polska*, 119; S. Medeksza, 'Bastejowe fortyfikacje zamku w Janowcu', *Bastejowe fortyfikacje*, 125, 128-33.

45 M. Paradowski, *Against the Deluge. Polish and Lithuanian Armies During the War Against Sweden 1655-1660* (Warwick, 2022), vii-viii.

(*obozy podrózne*) akin to the famed Hussite *Wagenburg*, wherein wagons were secured one to the other in a large circle. Another choice was short-term camps, anchored by a dirt wall 1.8 meters high and fronted by a ditch 3.6 meters wide; these obstructions throttled opposing cavalries' attempts to hop over the obstructions and slaughter the soldiery inside. A third variant were fortified camps intended for long-term defense, reinforced by entrenchments and redoubts.[46] Although the last layout came closest to a Roman *castra*, there is no evidence supporting that the former ever served as nuclei for town development since urbanization had existed for many centuries already in Poland. Polish field fortifications worked well against the Swedes in the mid-1620s.

Polish military writers during the sixteenth- and first half of the seventeenth-centuries advocated building numerous small earthen-wood fortifications at key communication points in order to block Tatar incursions. Most were small, at times only several horsemen seizing a household's occupants, but other forays, even invasions, were not. Poland's southeastern frontier faced acute threat, compelling local authorities to arm townsmen and peasants and turn to magnates' armed retinues and Cossacks. Tatar competency in swiftly traversing great distances overrode Warsaw's inability to consolidate its border firmly, unlike Russia. Insight to contrive a more imaginative southeastern strategy was present, but the means were not. Additionally, marauding Polish soldiers, border reavers, Cossacks, and Moldavians, who unleashed their rapacity on individual villages and even individual households, plagued the southeastern frontier, [47] a reminder of borderlands' potential for individuals' anomie and social tumult.

The Grand Duchy of Lithuania

The Medieval Lithuanian Princedom or GDL first consisted of Eastern Baltic ethnic Lithuanians. Eventually, an even larger number of Eastern Slavs populated it as the GDL plunged south in the aftermath of Mongol onslaughts from 1237 to 1241. The GDL's 1386 dynastic union with Poland gave way to the 1569 Lublin confederation of the two, sparked by initial Russian success in

46 Wimmer, *Wojsko polskie*, 315; R. Frost, *The Northern Wars 1558-1721. War, State, and Society in Northeastern Europe, 1558-1721* (Harlow, England, 2000), 106.

47 Z. Chmiel, 'Znaczenie fortyfikacji', 167-68, 170.

the Livonian War (1558-82). In effect the GDL became a Belorussian realm in which Polish and Belorussian were official, spoken languages.

The Union of Lublin nearly halved the Grand Duchy; what was left was a roughly square shaped country with barely any seacoast. Bordering on the north was Courland (western Latvia) and Inflanty (eastern Latvia and southern Estonia); on the northeast and east, Muscovy; on the south, Polish Ukraine; and on the west, Poland and Royal Prussia.[48] Like Poland and Ukraine, the Grand Duchy occupied flat terrain and did not enjoy the protection that northern France did with the adjacent riverine lands of the Low Countries, the Hürtgen Forest, and the Jura Mountains. The Pripet Marshes of southern Belarus to some extent acted as defensive barrier.

The GDL utilized both earthen-wood and stone fortifications.[49] Similar to Poland, GDL stone fortresses had one, relatively high curtain with interspersed bastions, wrapped around a central urban area. This was true for Vilnius (Belor., Vilna), Trakai, Kaunas, Ragainé (now Neman), Biržai , Panemunė, and Tilžė and for Belorussian towns like Orsha, Kopys, Palatsk (Russ., Polotsk), Mahilëv (Russ., Mogilev), and Brest.[50]

The infirmities of chronic underfunding from the central administration and the noble class' suspicion of fortresses as a wedge for a strong monarchy were phenomena stronger in the GDL than in Poland. They struck the Grand Duchy harshly during the first two years of the Thirteen Years' War (1654-67). With minimal siege Vilnius fell in August 1655 attributable to Ukrainian and Russian assault from the south and west. Low morale was the key factor in the citadel's fall. To the contrary, in 1660 and 1661 the Russian-occupied Vilnius castle fortresses hung on for one and one-half years before succumbing to the attacking Poles.[51]

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48 Dybaś, *Fortece Rzeczypospolitej*, 125-26.

49 Dybaś, *Fortece Rzeczypospolitej*, 125-26.

50 A. Bumblauskas, *Senosios Lietuvos istorija 1009-1795* (Vilnius, 2007), 238, 307, 326-27, 330-31, 394-97, 426; A. Žvilius, *Lietuvos istorija* (Vilnius, 2010), 41; Belaruskaia entsyklapedyia, *Entsyklapedyia historyi Belarusi* (6 vols., Minsk, 1993-2003), ii (1994), 84, 311-12; iv (1997), 234; v (1999), 8, 150, 519, 537; Czapliński and Ładogorski, *Atlas historyczny Polski*, 24-25.

51 E. Meilus (comp.), *XVII Amžiaus vidurio Maskvos okupacijos Lietuvoje* šaltiniai (4 vols., Vilnius, 2011-16), i, 684-85; ii, 783.

A peculiar feature of Early Modern Lithuanian social life was the extent to which a few extraordinarily powerful magnate families controlled huge swaths of land, especially in the Belorussian part of the GDL. These families often funded the fortification of their manors and towns lying within their domains. Such activity displays also the inability of state power to monopolize defense strategy within the GDL. Even stone-fortified synagogues existed.[52]

Ukraine

Determining agency for stone fortress-building in Ukraine unveils hardships of attribution. Although stone fortifications in Ukraine date to the Kievan Rus' era and most likely before, a Ukrainian national sovereignty dates only from 1648 with the outbreak of the Ukrainian Revolution against the Poles and afterwards the formation of the Cossack hetmanates. One was primarily on the Left-Bank (eastern side, 1662-1781) of the Dnepr River, while the other was on the Right-Bank (western side, 1663-1715). The Right-Bank hetmanate was under Polish and Turkish sway at various times. There was yet a third Ukrainian political entity that mattered, the Zaporizhian (south of the Dnepr Rapids) Sich (Host). Composed of runaway serfs from Poland and serfs and slaves from Muscovy, the Zaporizhian Sich, which became part of Left-Bank Ukraine, traced its origins to the sixteenth century. All three Ukrainian polities had short-life spans. Arguably, the Zaporizhian Sich Cossack lands were an independent, political entity.[53]

Bohdan Cherkes and Iliía Lytvynchuk posit two directions in Ukrainian fortification planning. One of them was 'spontaneous' without any coherent model, while the other was intentional with designated places for defensive sites, market areas, and churches. Lack of funding and urban population growth blunted the latter pathway. In Eastern Podilia town fortifications noticeably consisted of wooden walls and towers until the sixteenth century's emphasis on stone curtains and bastions.[54] The massive fortress construction projects in later sev-

52 Bumblauskas, *Senosios Lietuvos istorija*, 391.

53 V. Hrytseliak and I. Dykyy and I. Rovenchak, *Atlas istoriï ukraïns'koï derzhavnosti. Ukraïns'ki zemli vid naydavnishykh chasiv do s'ohodennia* (Kyïv, 2nd ed., rev., 2005), 68-77.

54 B. Cherkes and I. Lytvynchuk, 'Spontaneous and Regular Models of Fortified Cities of

Picture 2—Western Ukraine. Fortified Synagogue. Town of Husiatyn, Ternopil' Province (oblast'). Photo Mummik 2015. CC SA 4.0. Wikimedia Commons

enteenth-century France or Muscovite fortress building was entirely in central governmental hands. One Rzeczpospolita pattern of private magnates leveraging their own administrative chambers to fund fortress projects persisted in Western Ukraine as well.[55]

Because of the delayed and truncated nature of Early Modern Ukrainian state-building, Ukrainian polities had few opportunities to build stone fortifications. This problem is ascribable to weak governmental financing, constant warfare affecting construction mobilization, and military doctrine favoring maneuverable field armies. The sizable quantity of stone fortresses on the Ukrainian lands almost entirely was erected prior to 1648 by the Galician Principality,

Ukraine in the 16th-17th Centuries', *Architectural Studies* vi, 1 (2020), 1-3.

55 I. Lytvynchuk and O. Rybchynskyi, 'Problemy doslidzhennia urbanistychnykh oboronnykh kompleksiv mist skhidnoho Podillia xvi-xviii st.', *Current Issues in Research, Conservation, and Restoration of Historic Fortifications* xiii (2020), 90, 94, 96.

small territorial entities, the Moldovan Princedom, the GDL, and Poland. Both national and local administrative centers participated in the planning, labor mobilization, and building of these fortifications along with noblemen and merchants.[56]

Stone was less common in Eastern Ukrainian fortifications, though Sich capital Chyhyryn harbored a stone fortress. Lithuanian Grand Prince Vytautas (1392-1430) around 1400 initiated the policy of 'holding back the steppe'—trying to keep the Mongol-Tatars at bay. He inaugurated a comprehensive program of building stone fortresses across the southeastern frontier of the GDL, starting from Lithuania and Belarus and proceeding to north of the Black Sea. Byzantine fortresses, with their triangular shapes and four-sided bastions served as the model in an era as yet weakly defined by cannonry.[57] His ambitions greatly overshot accomplishments. The Rzeczpospolita was never able to keep the Tatars at bay, unlike the Russians.

Western Ukrainian fortification evinced less central planning than in France, and was oriented primarily towards the Crimean Tatars but noticeably against the Ottoman Turks. Slave booty excited the Tatars, not territorial annexation or lengthy sieges. The Crimeans conducted their cavalry *riazza*s briskly, withdrew, abjuring heavy siege equipment, hence no need to blindly copy French fortification policy. High walls with firing platforms and parapets were adequate to keep the bow-and-arrow fighting Tatars at bay and outlast any envelopment; Tatar staying power was limited. However, Muscovite and Cossack armies during the first two years of the Thirteen Years' War overran the Commonwealth's fortresses and fortified towns without too much difficulty; the one-curtain perimeter wall policy fell apart. The size and speed of the enveloping forces, particularly the Cossacks, made their victories intelligible.[58]

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56 *Atlas istoriï ukraïns'koï derzhavnosti*, 56-61, 64-67; I. Lytvynchuk and O. Rybchynskyi, 'Typological Features and Problems of Preserving Urban Defense Complexes of Private Cities of the Princes of Zbarazh in Podillia, Kyïv Region, and Volhyn in Podillia, Kyïv Region, and Volhyn in the xvi-xvii Centuries', *Architectural Studies* vii, 1 (2021), 80-84.

57 S. Biliaieva, 'Ukraïns'ki obriï pivnichnoho prychornomor'ia: istoryko-arkheolohichni sposterezhennia', *Arkheolohiia i davnia istoriia Ukraïny* xxxviii, 1, 443-44; Czapliński and Ładogórski, *Atlas Historyczny Polski,* 12-13.

58 V. Tereshchenko and O. Polishchuk, 'Budivnytstvo p'iatykutnykh zamkiv v rann'omod-

Unlike the Crimean Tatars, the Ottomans fielded well-codified armies with infantry, artillery, and cavalry. Sporadically, Poles and Turks fought several seesaw contests (1620-21, 1672-76, 1683-99) over Podilia and Volynia that in the 1670s thrust Podilia under Ottoman dominion, but did not incentivize Poland to invest heavily in southeastern complex fortification. The 1699 Treaty of Karlowitz undercut Turkish domination of Right-Bank Ukraine.[59]

Lateness of Ukrainian statehood and corresponding incapacity of the Left-Bank Hetmanate to create a centralized government on par with its neighbors helps explain why the Left-Bank's record in building stone fortifications was spotty. The obligatory armada of mathematicians, planners, stone-cutters, and fitters had yet to appear. Ingenuity with wood and earth compensated, and consequently a seventeenth-century 'cossack style' of fortification emerged on the Left-Bank. Sloping, broad earthen ramparts, sometimes reinforced by a log palisade with wide wooden walls, albeit not tall ones, fashioned from vertically emplaced logs mounted on top were standard. In front of the walls were sharpened log-stakes, often pointing at a 40°-50° angle with a frontal ditch. The work parties at times constructed wooden bastions and towers. The Sich Cossacks' core force comprised cavalry and infantry, and fortified settlements housed them.

Seventeenth-century local princes in eastern Galicia and in north Central Ukraine cleverly exploited meandering rivers, peninsulas, and lakes to build town walls and small-sized forts (castles) to enclose towns.[60] A mixture of earth,

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ernii Halychyni: metodychni problem doslidzhennia', *Current Issues in Research, Conservation, and Restoration of Historic Fortifications* xxi (2024), 74; O. Ivaniuk and E. Kovalov, 'Fortyfikatsiini pam'iatky u kul'turnomu konteksti: ukraïns' kyi dosvid (rannii chas ta xix st.)', *Visnyk natsional'noï akademii kerivnykh kadriv kul'tury i mystetsv*, 2018, iii: 134-37. P. Brown, 'Tsar Aleskei Mikhailovich: Muscovite Military Command Style and Legacy to Russian Military History', Eric Lohr and Marshall Poe (eds.), *The Military and Society in Russia 1450-1917* (Leiden, 2002), 123-25. There is a substantial number of Anglophone works on seventeenth-century Polish Lithuanian, Russian, and Ukrainian warfare and Ottoman steppe involvement. See, for example, William O'Neill, Richard Hellie, Robert Frost, Serhii Plokhy, Carol B. Stevens, Peter B. Brown, Michael Khodarkovsky, Brian Davies, Brian J. Boeck, and Christoph Witzenrath.

59 E. Zhukov, *Sovetskaia istoricheskaia entsiklopediia* (16 vols., Moscow, 1961-76), xi, 318-19.

60 Lytvynchuk and Rybchynskyi, 'Typological Features', 79-84; R. Frost, *The Northern Wars 1558-1721. War, State, and Society in Northeastern Europe, 1558-1721*

wood, and stone figured in these configurations to repel Crimean Tatar attacks. By the second half of the seventeenth century such structures visibly were becoming obsolete thanks to field artillery improvements elsewhere.

For decades prior to the 1648 Khmel'nyts'kyi Uprising, Sich Cossacks, fighting with the regular Polish armed forces, became well-acquainted with fortress and lesser fortification construction, garrison, and assault practices, and devised competent tactics. However, accumulating stress in the 1620s and 1630s from Polish landowners' mounting arrogation of Ukrainian territory and the deepening—even the introduction—of serfdom steepened. This tableau fed clashes between Polish and Sich units and Cossack campaigns against fortified towns and estates. Their Eastern Slavic inhabitants, sympathizing with the Cossacks, surrendered their locales, another indication of the link between morale and a besieged populations' determination to resist.[61]

The existence of multiple Ukraines affected fortification choices and heritage-, experiential, academic, imposed, and environmental learning thrust itself upon them. Western Ukraine witnessed burgeoning stone fortification building between the fourteenth and seventeenth centuries, first under GDL and then Polish dominion. According to the data and photographs in *Zamky ta fortelsï* (Castles and Fortresses), in the Ukrainian provinces of L'viv, Ternopil', Khmel'nyts'kyi, Zhytomir, Ivano-Frankivs'k, and Chernivtsi; in the Carpathian region; and in an adjacent part of Volynia there were fifty-eight fortresses,[62] eight fortified monasteries,[63] four fortified churches,[64] two fortified towers, one fortified synagogue,[65] and one fortified mansion[66]—a total of seventy-four stone fortifications. Their origins dated to the Kievan-Appanage Period and to the fifteenth, sixteenth, and seventeenth centuries when many were built from scratch.

Designs abounded. Some followed Italian and French layouts and were

(Harlow, 2000), 50.

61 Chmiel, 'Znaczenie fortyfikacji', 174-76.

62 A. Vakulenko, *Zamky ta fortsetsi. Castles and Fortresses* (Kyïv, 2007), 124-39, 142-47, 150-51, 156-67, 172-75, 182-87, 190-97, 202-63, 266-69, 272-303, 306-19, 324-25.

63 *Zamky ta fortsetsi*, 82-85, 88-89, 110-13, 140-41, 168-71, 188-89, 198-201, 270-71.

64 *Zamky ta fortsetsi*, 264-65, 320-23.

65 *Zamky ta fortsetsi*, 148-49, 152-55.

66 *Zamky ta fortsetsi*, 304-05.

recognizably Western European, while others were 'nativist' in the sense that they heavily incorporated Eastern European patterns evolved over centuries. These came down to erecting one line of medium-height stone walls with rounded bastions and even central towers about an existing town. This style improved upon the pre-Kievan and Kievan Rus' town (*gorod*) with an unprotected commercial sector downhill from a palisades military-administrative headquarters. The Dutch school of curtains angled 90º to the ground and the flooding of lands around a fortification did not resonate in Rzeczpospolita and Ukrainian circles.

The defense posture of large Western Ukrainian towns shifted to protecting the civilian economic and living quarter spaces through fortified enclosure. This phenomenon was observable in the ethnic Lithuanian and Belorussian parts of the GDL and in other parts of erstwhile Kievan Rus'.[67] The patterns of the Western Ukrainian fortresses varied: some had regular geometric shapes of whatever configuration while others were irregular quadrilateral and polygonal. The curtains incorporated round, square, or pentagonal bastions, depending upon available expertise for assembling whatever contour, assessing the assault tactics of the opposing force, and prioritizing the minimizing of dead zones—round bastions having the biggest. The curtains themselves joined to a bastion at 90° sentient angles or at 30°, 45°, or 60°. Few were the instances of the 72°/108° spread of the pentagonal scheme; its absence created shot traps to the defenders' disadvantage, less encountered or not at all in the *trace italienne*.

Constructed from the 1300s, L'viv remains the most mature example of a seventeenth-century Western Ukrainian fortress. Three separate walls were built, the third bastioned one came into full swing during the sixteenth century. Initially there were only palisades and ramparts. In the 1500s thirteen Italian, Austrian, and Ukrainian engineers assisted this project,[68] highlighting the international pooling of talent in fortification art.

Several hypothetical reconstructions of the Rohatyn fortress, south of Lviv, depict *trace italienne* influence. One schema shows 72° angled bastions and another with as many as twelve angled bastions inserted in a wall enclosing the

67 Lytvynchuk and Rybchynskyi, 'Problemy doslidzhennia', 97.

68 I. Okonchenko and O. Okonchenko, 'Evoliutsiia L'vivs'kykh ukriplen' xiv-xvii st. ta ikh lokalizatsiia na suchasnii topohrafichnii karti', *Visnyk natsional'noho universytetu* i (2024), 133-35, 138-39.

merchantry and cultic areas.[69] The Rohatyn and L'viv cases are not alone in displaying the familiarity of Polish and Western Ukrainian military engineers with Italian and French fortress literature.

Nevertheless, with few exceptions the detailed, internal fortress redundancy of the seventeenth-century French fortification school failed to imprint itself upon Western Ukrainian fortresses, nor was there any need to. France fought almost constantly combinations of the heavily armed Austrian, Spanish, Dutch, Prussian, English, and Scottish armies in the Low Countries, the Rhineland, Northern France, Spain, and other places. This circumstance forced Louis XIV's government to intensely fortify Northern France and elsewhere and generate complicated defenses against opponents with an abundance of large-caliber field artillery.

The French government in the small area of its northern quadrangle achieved a fortress density unavailable in the Western Ukrainian polygonal defense zone. The southwestern-northeastern axis from Trans-Carpathian Uzhorod to Kyïv is 544 kilometers, in comparison to the 263 kilometers of the same directional axis from Dieppe to Namur. The northwestern-southeastern axis from Lutsk to Ivano-Frankiv measures 253 kilometers in contrast to the northwestern-southeastern axis from Dunkerque to Sedan of 225 kilometers. The area of the Western Ukraine defense polygon was about three times as large as the French quadrilateral's.

Warsaw's funding capacity was more limited than the near bankrupt French fisc. Steppe and steppe-adjacent warfare primarily involved cavalry and long-range mobility, which differed from the terrain desiderata of Louis XIV's conflicts. The Commonwealth adopted a defensive strategy of punctuating its countryside with fortresses to slow down and divert Crimean Tatar forces, while the Polish forces mobilized and then sallied forth. The positioning of Western Ukraine's fortresses tellingly reveals how Poland used the Carpathian Mountains as a barrier to the southwest. The Poles did not build forts in the steppe where vulnerability was greatest, preferring to station their stationary assets and cavalry in the forest-steppe.

69 M. Bevz, 'Staryï i novyï zamky v misti Rohatyni: rozplanuval'na struktura ta arkhitektura', *Research, Conservation, and Restoration of Historic Fortifications* xx (2024), 14, 18, 20, 22, 24.

The high point of Western Ukrainian fortress building was from 1550 to 1650; later Russian victories over the Turks and the Polish Partitions made inutile what were now interior fortresses in Western Ukraine. The Russian authorities later dismantled some. As was true for many Early Modern French fortresses in World War I, World War II inflicted enormous damage upon the Western Ukrainian fortresses, thereby greatly impeding archeological work, restoration, and visualization.[70]

Muscovite Russia

Muscovy's fortification sweep was vast—truly Eurasian—extending from Northwestern Russia into Eastern Siberia. This arc's distance surpassed the Brazilian littoral's, and moreover Russia's arc connected north to south. Without exaggeration one can say that Muscovy—*Festung* Russia—had fortified itself everywhere in the course of its expansion from the 1200s into the 1600s. Moscow's fortification options varied tremendously, from the gigantic stone and brick fortress walls of the Moscow Kremlin and Smolensk to earthen and wooden small town or field fortifications with many variations of size and material. The total number of fortifications surviving into the seventeenth century and also built then, along with those constructed earlier, since dismantled or disintegrated, was exceedingly large.

Characteristic of high-status Muscovite fortifications were the kremlins (citadels), which were high, stone bastioned and ramparted walls encircling the administrative-military, commercial, and cultic areas of the inner core of a city or town. There were many citadels by the seventeenth century. Some of the prominent ones were Moscow, Suzdal', Nizhnii Novgorod, Kazan', Astrakhan', Kolomna, Tula, Rostov, Vologda, Zaraisk, Serpukhov, Smolensk, Novgorod, and Pskov.[71]

Historically, Moscow pursued internal and not overseas' colonization. The government was in charge of fortification and its tasks were monumental. Muscovy had six major seventeenth-century conflicts: Time of Troubles (1598-1618),

70 Ivaniuk and Kovalov, 'Fortyfikatsiini pam'iatky', 135; Tereshchenko and Polishchuk, 'Budivnytsvo', 73.

71 Zhukov, *Entsiklopediia*, viii, 55.

Smolensk War (1632-34), Thirteen Years' War, Russo-Turkish War (1676-81), an Ottoman reprise (1686-99), and the ongoing Crimean Tatar, southern frontier struggle.

No well-organized military opponent threatened Muscovy's northern Arctic littoral and Siberia, unlike on Russia's western and southern borderlands. To the west were the Swedes with formidable offensive infantry, field artillery, and cavalry and the Poles with their stellar cavalry and quite competent infantry. The Lithuanians, or more accurately the Belorussians, had cavalry and infantry of lesser quality than the Poles. Muscovy, for the sake of its western and southern frontiers, indulged in considerable expenditure, asymmetrical central administrative growth, and stilted class evolution to foster a modern, firearms-equiped army and advancing fortified lines in the south. The unrelenting *razzia*s of the pre-firearms' era Crimean Tatars tormented Russia along the southern frontier from the late 1400s into the 1700s.

The territory north of Moscow was not vulnerable to nomadic or Western attack and therefore, there was no concerted fortification strategy. Nonetheless, the thick-walled churches of the Russian North, such as those in Pereiaslav-Zaleskii, Rostov, Iaroslavl', and Vologda arrest one's attention. Rostov's churches were especially fortified and Vologda, far up the Northern Dvina River, had a noteworthy *kremlin*. The northern Beloozerskii and White Sea Solovetskii Monasteries were fortresses in their own right, above all the latter. For eight years Muscovite armies in the late seventeenth century besieged Solovetskii, until they broke through and slaughtered the dissident monks.

Though improved upon during the sixteenth and seventeenth centuries, many of these structures originally existed during Appanage, even Kievan, times. They became part of Muscovy when they were annexed, purchased, acquired through marriage, or bequeathed to it by local rulers. *Intoto*, the disbursement of circular, fortified town walls throughout Russia came about through historical accident as Muscovy expanded as much as it did through deliberate policy in the capital.

Muscovite stone and brick fortification history is impressive. One spectacular example is the high-curtained, red Kremlin wall, built in the 1470s and surrounded by earlier erected white stone and earthen walls. Italian architect Aristotele Fioravanti designed the Kremlin wall. Though he undoubtedly was familiar with the *trace italienne*, he chose not to install it or was simply told not to. Political and prestige concerns guided the choice made. A high wall was

Picture 3—Northern Russia. Solovetskii Monastery. Fortified Monastery. Solovki Islands, White Sea. Photo Trasprd 2017. CC BY-SA 4.0 Wikimedia Commons.

symbolic. Another motivational factor for wall design had to be Muscovite experience with the Mongol-Tatars. In centuries past they were the capital's nemesis, against whom high-walled compounds were considered the best defense.

The 6½ kilometer long Smolensk Fortress town wall, erected between 1595 and 1602, was a Eurasian marvel, and unquestionably built in response to the recent Russo-Swedish War (1590-95). The wall, erected over highly uneven terrain, had thirty-eight round and square bastions, often twenty-five meters tall, and walls between four and seven meters thick and eight to thirteen meters high. There were parapets throughout. The Smolensk wall used 620,000 large, white facing stones; one hundred million bricks; one million cartloads of sand; 320,000 barrels of lime; one million large nails; 245,189 kilograms of iron rods; 320,000 piles; 5,000 12.8 meter-long wooden beams; over 200,000 seven-meter-long wooden beams; over one million wooden boards of varying dimensions; and 9,650 cartloads of clay.[72] Topographical unevenness, funding concerns, and

72 P. Brown, 'Muscovite Arithmetic in Seventeenth-Century Russian Civilization: Is It Not Time

lack of expertise aside, desire to shield town churches and other buildings help explain why the Russians chose not to construct highly-angled, low-slung walls as the Northern Italians did. The cumbersome Muscovite alphanumerical system does not seem to have impaired the Russians' Smolensk engineering, given their aims, or elsewhere in Muscovy during the seventeenth century. However, their numeric symbols significantly retarded Russia's artillery proficiency—impetus for Peter the Great (1689-1725) establishing in 1698 artillerists' schools teaching arithmetic, geometry with proofs, trigonometry, and field and fortress artillery site design and construction.[73]

Additionally, the seventeenth-century Russians availed themselves of mobile fortifications, chiefly the *guliai gorod* of variable length and consisting of clamped-together vertical, wooden boards with firing apertures and the *Wagenburg* (encircled wagons). Both performed offensive and defensive tasks.[74] The Polish and Hussite *Wagenburg* come to mind, and illustrate Eurasian military knowledge dissemination, particularly among the hinterland powers examined.

Fortifications with earthen-wood ramparts, palisades, and walls were plentiful in seventeenth-century Russia, along the southern frontier, in the southeast along the Volga River, and across Siberia. The Oka, Belgorod, Simbirsk, and Izium fortified lines, with their involved military stationing, colonization, and patrolling along the southern frontier, exhibited this building style totally. Moscow's fortified-line policy encompassed state-sponsored military and peasant colonization and incorporation of non-Russian populations encountered.[75]

The Starodub fortification, which passed back-and-forth among Russia, Poland, the Grand Duchy of Lithuaia (GDL), and the Hetmanate illustrates foreign architects' contributions. The Italian architect Pietro Francesco Annibale most likely designed the original Starodub fortress in the 1530s, along with other wooden-bastion fortifications in Southern and Northwestern Russia, Pronsk,

to Discard the Backwardness Label?', *Russian History* xxxix, 4 (2012), 440.

73 V. Benda, *Russkaia artilleriia i inzhenernoe delo v kontse xvii-pervoi chetverti xviii veka. Monografiia* (SPb, 2019), 41.

74 B. Davies, 'Gulai-gorod, Wagenburg, and Tabor Tactics in 16th-17th Century Muscovy and Eastern Europe', *Warfare in Eastern Europe, 1500-1800*, Brian J. Davies (ed.) (Leiden; Boston, 2012), 93-108.

75 W. Sunderland, *Taming the Wild Field. Colonization and Empire of the Russian Steppe* (Ithaca, 2004), 11-34.

Picture 4—Southern Russia. Astrakhan' Kremlin. On Volga River near Caspian Sea. Astrakhan Musei 2015. CC BY-SA 4.0 Wikimedia Commons

and Sebezh. Annibale's activities demonstrate that the Russians were aware of European military architectural trends as indeed was so more than fifty years earlier when Fioravanti was present.[76]

Since the very early 1600s the Muscovites became acquainted with Dutch close-order drill or 'military learning' (*ratnoe* or *voinskoe uchenie*) and other modern Dutch and even Swedish teachings. They stressed linear tactics, maximizing infantry firepower, and introducing newer, portable palisades. Western fortification doctrines do not appear to have penetrated the graphosphere of the Muscovite military powerbrokers, although administrative officials wrote up in 1607 the lengthy 'Regulation on Infantry and Artillery Matters'. Among other subjects it discussed building fortified towns and fortifications, conducting their defense, and unleashing besiegement, and was a step forward. Nonetheless, Russian infantry, using long-outmoded tactics, repeatedly threw infantry forces against Turkish fortifications during the 1695 Azov campaign.[77]

What structured seventeenth-century Muscovite fortification policies was the Moscow central administration, a Weberian bureaucracy with clearly delineated bureaus (chancelleries) fulfilling discrete functions and staffed by professional bureaucrats. Of the nearly fifty military chancelleries, two of them explicitly managed fortifications: *kamennyi prikaz* (Stonework Chancellery) and the *prikaz gorodovogo dela* (Fortress Construction Chancellery). Many other *prikazy* were involved in supporting roles, such as artillery manufacturing (*Pushkarskii prikaz*) and those responsible for finance and supply, military administration, and personnel assignment.[78]

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76 V. Gur'ianov and A. Chubur, 'Dereviannye konstruktsii starodubskoi kreposti xvi-xviii vv. (k 40-letiiu nachala issledovanii)', *Arkheologiia evraziiskikh stepei* iv (2023), 35-36, 39-40; E. Dubman, 'Osobennosti fortifikatsionnogo stroitel'stva v lesostepnom Zavolzh'e pervoi treti xviii v.', *Vestnik samarskogo universiteta. Istoriia, pedagogika, filologiia* xxvii, 2: 18; A. Lokhov and I. Eremin and A. Natsvin, 'Komp'iuternaia rekonstruktsiia derevozemlianoi Albazinskoi kreposti', *Problemy sotsial'no ekonomicheskogo razvitiia Sibiri* i (2024), 89-95.

77 O. Rusakovskiy, *European Military Books and Intellectual Cultures of War in 17th-Century Russia. From Translation to Adaption* (Leiden: Boston, 2024), 76-82; R. Hellie, *Enserfment and Military Change in Muscovy* (Chicago, 1971), 164-65, 168, 188; Benda, *Russkaia artilleriia i inzhenernoe delo*, 11, 33.

78 P. Brown, 'Muscovite Government Bureaus', *Russian History* x, 3 (1983), 288-90, 298, 310.

Conclusion

All four outliers, whether facing the Atlantic or Western Eurasian hinterlands, enjoyed differing political structures, yet evolved similar solutions as shaped by specific human and environmental constraints. Muscovy was the most successful of the three interior Eurasian realms. Unlike the Rzeczpospolita and Ukraine which had none, Russia possessed soft frontiers, and did not have to invest heavily in stone fortresses from the north of Moscow to the White Sea nor to the east of the capital. Paradoxically, the southern frontier earth and wooden fortifications, used in both defensive and offensive modes, proved the most successful in building state power via territorial expansion towards the Black Sea. Brazilian stone fortresses proved to be a reliable although by no means infallible deterrent.

The cost-effectiveness of investing large sums and captive labor forces into erecting and upgrading stone fortresses or lesser stone fortifications is debatable. Might a better alternative have been building permanent, large, up-to-date armies trained to react momentarily against an intruder through swift offense? The Polish-Lithuanian Eastern Front debacle of 1654-55 suggests the futility of the former option—in the case of the Rzeczpospolita—on the Eastern European Plain. In the same years the swarming tactics of the Hetmanate's forces against the Poles, often avoiding their strong points, points to the latter alternative.

Thanks to no threats from the north and east, once Muscovy secured Smolensk in 1654 Russia blocked its western frontier to invasion until 1812 and did not have to worry about assault through a 'back door'. The key to a successful policy of deterrence and combat effectiveness through stone fortresses appears to having a *tyl* (the rear) not threatened by hostile forces even further behind it. This concept also fits Brazil, though seventeenth-century uprisings by immiserated lower social strata inside Muscovy and Brazil partially undercut this argument, as does the Brazilian *quilombo* phenomenon.

The view from the 'East' necessitates recasting Louis XIV's fortification policy. The French could not trade territory for time. The spaciousness of the lands to the east of the Vistula River could: for the Russians certainly, even for the harder pressed Poles and Western Ukraine, and probably for the Brazilian Portuguese.

More needs to be learned about the social and economic implications of seventeenth-century fortification policies for Brazil, the Rzeczpospolita, Ukraine, and Muscovy. Stone fortresses in particular were a costly enterprise. They helped perpetuate unfree hereditary labor systems, in the case of Russia through anchoring peasants in place as an income source for state coffers and in the Brazilian story as a labor pool. How fortification construction diverted alternative state and private economic pursuits and policies remains a scholarly field demanding conscientious exploration. The larger issues surrounding this essay are choice, contingency, and inevitability in a profoundly violent, pre-industrial century.

Ostrog (= Fortress) Tower of Ilimsk (1667) in the Taltsy Museum near Irkutsk
Photo Dr. A. Hugentobler 2000, CC BY-SA 2.5 Wikimedia Commons

"Mutua se spectant brachia": The Fossa Eugeniana, Siege and Economic Warfare in the Seventeenth-Century Low Countries. *

by T.G. Otte

This essay on the ultimately abortive plans of the Spanish Habsburg authorities in Madrid and Brussels to link the rivers Rhine and Meuse is offered as a set of variations on the theme of fortifications and siege warfare. As with sieges in general, the canal project, ambitious in its scope if not in its execution, had in view a constant, low-intensity type of attritional conflict with the aim of undermining the enemy's warfighting capabilities. In pursuit of this object, it used elements normally associated with siege warfare. The scheme also throws into sharper relief related matters: grand strategy, international diplomacy, fortification, transport logistics, water management and the financial sinews of war. In this sense the case of the so-called *Fossa Eugeniana*[1] shows both the potential and the limitations of seventeenth-century economic and siege warfare.

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* In line with standard practice the English version of rulers' names and of place names is used, hence Philip IV rather than Felipe and Antwerp rather than Antwerpen. Similarly, territorial names are given in English, but otherwise geographical locations places are referred to by their modern names, hence, e.g., the Duchy of Guelders but the town of Geldern.

1 The canal project has been the subject of numerous studies. Early scholarly works include J. Real, 'Die Fossa Eugeniana', *Bijdragen en Mededeelingen van Gelre* viii (1905), 233-38; J.D.M. Cornelissen, 'Het Maas- en Rijnkanaal van 1626', *Mededeelingen van het Nederlandse Historische Instituut te Rome* ix (1929), 193-204; A. Veenendaal, 'De Fossa Eugeniana', *Bijdragen voor de geschiedenis der Nederlanden* xi (1956), 2-39. The *Fossa* also attracted the attention of local and regional historians. The most significant works are R.-G. Pistor and H. Smeets, *Die Fossa Eugeniana: Eine unvollendete Kanalverbindung zwischen Rhein und Maas 1626* (Cologne, 1979) and W. Dassel and R. Plötz (eds.), *Fossa Eugeniana: Weltgeschichte in der Region* (Kevelaer, 1997); see further P. Obertreis, 'Erste Versuche zu einem Rhein—Maaskanal: Eine geschichtlich-wasserwirtschaftliche Studies', *Geldernscher Heimatkalender 1963* (Geldern, 1962), 72-78, and W. Hendriks, 'Die Fossa Eugeniana', *Heimatkalender für den Kreis Moers 1965* (Moers, 1964), 88-98.

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Low-lying and fertile, the territories between and along the lower sections of Rhine and Meuse, part of the Rhine *Urstromtal*, did not lack in watercourses and drainage ditches, though there were also glacial moraines, fens and stretches of heathland, all of which proved difficult to cultivate or to traverse.[2] What they did lack were natural connections between these two parallel rivers. Schemes to link them, or at least to build canals to and from them, can be traced back to Roman times, if Tacitus is to be believed. Whether any of them were realised or not, little or no trace of them remains in the modern landscape.[3]

The first real effort to connect the two rivers began with a solemn turf-cutting ceremony on 21 September 1626. War and geopolitical tensions provided the necessary fillip for the project. The territorial splintering of the lands between Rhine and Meuse and the confluence of separate European conflicts made it both necessary and ultimately impossible.

By the beginning of the seventeenth century, the territorial states that had begun to emerge in the region from around 1450 had either ceased to exist as autonomous entities or had fallen under the influence of powers in either the East or South of the Holy Roman Empire or, indeed, without it. After a protracted succession struggle and then a brief war, all four quarters of the Duchy of Guelders (Nijmegen (Betuwe), Arnhem (Veluwe), Zutphen, all to the north of Rhine and Waal, and the economically important Roermond, or upper, quarter further south, straddling the

2 It is estimated that Rhine and Meuse separated around 10,000 years ago. For some geomorphological discussions see M.F. Mörzer-Bruijns and R.J. Benthem (eds.), *Spectrum Atlas van de Nederlandse Landschappen* (Utrecht and Antwerp, 4th ed. 1979), 10-14 and 134-43; further A. Steeger, ‚Die Flussterrassen und Endmoränenlandschaft zwischen Krefeld, Moers und Geldern', L. Peters (ed.), *Albert Steeger: Studien zur niederrheinischen Landeskunde* (Kevelaer, 1981), 87-97.

3 Tacitus mentioned a *Fossa Drusiana*, linking Rhine and Ijssel, and a Rhine—Meuse link, the Corbulo canal between Leiden and Sluys, *Annales* II, 8 and XI, 20; J. Lendering and A. Bosman, *De Rand van het Rijk: De Romeinen en de Lage Landen* (Gennep, 2010); see further A. Demangeon and L. Febvre, *Le Rhin: Problèmes d'histoire et d'économie* (Paris, 1935), 33-39; further W. Jappe Alberts, *Overzicht van de geschiedenis van de Nederrijnse territoria tussen Maas en Rijn, 800 tot 1500* (2 vols., Assen, 1982) ii, 162-85. For a survey of the around twenty schemes see W. Föhl, ‚Der Rhein—Maas—Schelde Kanal, eine geschichtliche Übersicht', *Zeitschrift für Verkehrswissenschaft* xxvii, 2 (1956), 243-72, and W. Dassel, ‚*Navigare necesse est*: Kanalprojekte zwischen Rhein und Maas', id. and Plötz (eds.), *Fossa Eugeniana*, 8-14.

Meuse) fell under Habsburg rule in 1543.[4] Following Charles V's division of the Habsburg dominions on his abdication twelve years later, the duchy in its entirety, along with the rest of the Low Countries, was left to the Spanish branch of the dynasty, though all territories remained within the Empire.[5] Before too long, in the wake of the Dutch Revolt, the three lower quarters came under the effective control of the United Provinces.[6]

Neighbouring Cleves had been a powerful factor in the politics of the Rhine—Meuse region and with substantial territories along both rivers and stretching into Westphalia. But with its own ambitions on the Guelders inheritance thwarted in 1543, and having had to submit to Habsburg dominance, its influence steadily declined. By 1609, on the extinction of the ducal dynasty, the United Duchies of Gulick, Cleves and Berg faced their own succession struggle, which, as with all the conflicts of the period, was freighted with religious antagonisms. The electors of Brandenburg and the Palatinate laid claim to the Cleves-Gulick succession; and the prospect of a wider conflict streaked across the darkening horizon.[7] French and

4 The succession dispute began in 1511, P. Heidrich, *Der Geldrische Erbfolgekrieg, 1537-1543* (Kassel, 1896), 1-3; P. Schulpen, 'Het verdrag van Sittard, 1519: De Hertogdommen Kleef en Gulick—Berg in de strijd tussen de Habsburgers en het hertogdom Gelre', *Publications de la Société Historique et Archéologique dans le Limbourg* cliii (2017), 37-76; P. van Peteghem, ‚Die Vorstufen der Eroberung Gelderns im Jahre 1543 aus europäischer Sicht', J.F.G. Goeters and J. Prieur (eds.), *Der Niederrhein zwischen Mittelater und Neuzeit* (Wesel, 1986), 64-113; and further the essays by O. Moorman van Kampen, ‚De vrede van Venlo (1543): Keerpunt in de geschiedenis en sluitstuk van een conequent volgehouden politiek', and W. Janssen, ‚Der Länerverband Jülich-Kleve-Mark-Ravensberg im geldrischen Erbfolgestreit, 1537-1543', F. Keverling Buisman (ed.), *Verdrag en Tractaat van Venlo: Herdenkingsbundel, 1543-1993* (Hilversum, 1993), 7-12 and 13-40.

5 G. Janssen, 'De eerste jaaren van Filips II', D.P. Blok et al. (eds.), *Algemene Geschiedenis der Nederlanden*, vi, *Nieuwe Tijd, 1490-1648* (Haarlem, 1979), 186-89.

6 W. Jappe Alberts, *Geschiedenis van de beide Limburgen* (2 vols., Assen, 1974-82) i, 143-85; F. Petri, ‚Geldern und der nördliche Niederrhein im Wandel der niederländischen und deutschen Geschichte', E. Ennen, A. Hartlieb von Wallthor and M. van Rey (eds.), *Franzi Petri: Zur Geschichte und Landeskunde der Rheinlande, Westfalens und ihrer westeuropäischen Nachbarn: Aufsätze und Vorträge aus vier Jahrzehnten* (Bonn, 1973), 821-39.

7 The last duke, Johann Wilhelm, suffered from various mental and physical afflictions and scarcely ruled his territories in any meaningful sense, H.C.E. Midelfort, *Mad Princes of Renaissance Germany* (Charlottesville, VA, and London, 1994), 94-124. For the rise and decline of Cleves, see W. Janssen, 'Kleve—Mark –Jülich—Berg—Ravensberg , 1400-1600', Museum Haus Koekkoek (ed.), *Land im Mittelpunkt der Mächte: Die Herzogtümer Jülich, Kleve, Berg* (Kleve, 2nd ed. 1984), 17-40. For the international background see C.H. Carter, *The Secret Diplomacy of the Habsburgs, 1598-1625* (New York and London, 2nd ed. 1966),

English intervention prevented further escalation, and the two claimants eventually agreed to partition the duchies in the Treaty of Xanten of 1614, albeit against the fierce opposition of the estates of the territories concerned.[8]

A similar, though not terminal, decline marked the position of Cologne, one of the three ecclesiastic electorates of the Empire. Efforts to establish it, on the basis of the dukedom of Westphalia, as a major territorial state ended in military rout during the Limburg succession struggle at the end of the thirteenth century (- clerical rule, and hence uncertain succession, vitiated against continuity of policy at any rate). Survive, however, the electorate did, its core territory running along a narrow strip of land on the left bank of the Rhine from near Uerdingen to Neuwied and with a northern exclave around the strategically important fortress and Rhine toll station of Rheinberg (known then as Berck or Berka). Cologne also retained possessions in Westphalia (Vest Recklinghausen); and by the seventeenth century the elector often held the Cologne see in conjunction with the prince-bishopric of Liège. Cologne territories were not immune to religious strife, and one elector himself converted to Protestantism, only to be defeated and deposed by outside forces in 1585. With the end of the Cologne (or Truchsess) War, the electorate became a Wittelsbach *secundogeniture*. For the next one hundred and eighty years,

16-21; A.D. Anderson, *On the Verge of War: International Relations and the Jülich--Kleve Succession Crises* (Boston, MA, 1999); H.-W. Bergerhausen, ‚Der Jülich-Klevische Erbfolgestreit: Diplomatische Verhandlungen und Verträge', M. Groten, C. von Looz-Corswarem and W. Reininghaus (eds.), *Der Jülich-Klevische Erbstreit 1609: Seine Voraussetzungen und Folgen* (Düsseldorf, 2011), 55-68; for the consequences M. Kaiser, 'Zwischen zwei Herrschern: Die Landstände von Kleve—Mark und Jülich—Berg und die Herrschaftsansprüche Brandenburgs und Pfalz-Neuburgs H.-W. Bergerhausen, ‚Der Jülich-Klevische Erbfolgestreit: Diplomatische Verhandlungen und Verträge', M. Groten, C. von Looz-Corswarem and W. Reininghaus (eds.), *Der Jülich-Klevische Erbstreit 1609: Seine Voraussetzungen und Folgen* (Düsseldorf, 2011), 55-68, S. Kleinbongartz (ed.), *Fürsten, Macht und Krieg: Der Jülich—Klevische Erbfolgestreit* (Düsseldorf, 2014), 42-81.

8 Sticke to Schwarzenberg, ? Oct. 1614, Landesarchiv Nordrhein—Westfalen, Abteilung Rheinland, Duisburg [hereafter LANRW], Kleve—Mark, Akten Nr. 133; H.-W. Bergerhausen, ‚Der Jülich-Klevische Erbfolgestreit: Diplomatische Verhandlungen und Verträge', M. Groten, C. von Looz-Corswarem and W. Reininghaus (eds.), *Der Jülich-Klevische Erbstreit 1609: Seine Voraussetzungen und Folgen* (Düsseldorf, 2011), 55-68; and H.J. Roggersdorf, 'Die Politik des Pfalzgrafen von Neuenburg im Jülich—Klevischen Erbfolgestreit', *Düsseldorfer Jahrbuch* liii (1968), esp. 93-206. No official copy of the treaty seems to have survived, which gave rise already in 1615 to doubts as to its existence, R. Pons, 'Ein ungewisser Friede: Zum Friedensvertrag von Xanten (1614)', *Rheinische Vierteljahresblätter* lxxvii (2013), 73-85.

although the elector continued to rule as a prince of the Empire, key political and military decisions were often made at the Munich court rather than at his residence at Bonn.[9] At the same time, irrespective of Cologne's diminished position, the electors' status in the Empire and their Bavarian connection allowed them, if they chose to exert themselves, to leverage a degree of influence with other powers to safeguard their own interests. More especially German historians have tended to treat the territories between Rhine and Meuse in the early modern period as a marginal area on the fringes of the Empire, especially when compared with the growing power of the Austrian Habsburgs and the incipient rise of Brandenburg-Prussia. And yet the region was a major theatre in the Eighty Years' War between the Dutch and Spain[10], militarily significant for both parties and for each a key economic hinterland. It was with a view to both these considerations that the scheme of a Rhine—Meuse canal hove into view in the 1620s.

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The lands between the two rivers played a major role in Spanish strategic calculations. For three-quarters of a century, from the Cologne quarrel in the 1580s to the Peace of the Pyrenees in 1659, a web of Spanish military garrisons lay over the region. With such a 'network of formidable bastions', as Jonathan Israel has argued, the Spanish crown sought to place itself in a position 'to tip the balance politically and strategically in a part of Europe which for some time had been immersed in a bitter religious and political conflict which was bound to have far-reaching implications for the balance of power, and the position of the Habsburgs, throughout Europe.'[11] The conjunction of different wars complicated

9 Jappe Alberts, *Beide Limburgen* i, 73-78; for a succinct survey see R.R. Erkens and W. Janssen, ‚Das Erzstift Köln in geschichtlichem Überblick (seit 1288)', Nordrhein-Westfälisches Haupstaatsarchiv Düsseldorf (ed.), *Kurköln: Land unter dem Krummstab* (Kevelaer, 1985), 19-42; F. Petri, ‚Im Zeitalter der Glaubenskämpfe (1500-1648)', id. and M. Droege (eds.), *Rheinische Geschichte* (5 vols., Düsseldorf, 1976) ii, 9-122; H. Molitor, *Das Erzbistum Köln*, iii, *Im Zeitalter der Glaubenskämpfe, 1515-1688* (Cologne, 2008), 69-123 and 208-62; and further the detailed study by G. von Lojewski, *Bayerns Weg nach Köln: Geschichte der bayerischen Bistumspolitik in der zweiten Hälfte des 16. Jahrhunderts* (Bonn, 1962), esp. 346-416.

10 Even major scholars of Rhenish history have viewed the region as a '*Nebenkriegsschauplatz*' (subsidiary theatre of war) in the Spanish-Dutch struggle, see Petri, 'Zeitalter', 99.

11 J.I. Israel, *Conflicts of Empires: Spain, the Low Countries and the Struggle for World Su-*

such calculations. The Franco-Spanish war in northern Italy (1590-8) diverted Spain's resources elsewhere. It allowed the Dutch Republic to recoup territories lost in the 1580s and so bring Spain's northern *Reconquista* to a halt.[12] Worse, it allowed the Dutch to strengthen their defensive lines in the *rivierenland* along Waal and Meuse, from around Nijmegen to Dordrecht, to make them a more formidable barrier than before. The consequences of this for Spanish strategy were twofold. In the first place, with the most direct route into the heart of the Republic's territory blocked, it became imperative to establish an operational base, a sphere of political and military dominance, on the Lower Rhine inside the Empire. From here, the Dutch defences north of the rivers could be circumvented in a push against the much more vulnerable Ijssel line in the *Achterhoek* in the east and then on to Zutphen and Coevorden; and, in fact, every major Spanish incursion after 1601 was launched from this part of the Empire rather than from Flanders.[13] It was the reverse of the strategy pursued by Prince Maurits of Orange and his successors. Just as the Dutch knew that they could not prevail over the world power Spain unless they secured allies in Europe and extended the conflict overseas thereby forcing Madrid to disperse its resources, so the Spanish crown could only hope to defeat the rebellious provinces by concentrating its military efforts on the Low Countries and the Republic's potential weaknesses in particular.[14]

Secondly, it was only in conjunction with this strategic glacis in northwestern Germany that Spain's military might in the southern Low Countries could be used to influence the politics of the Empire. Without secure bases between Meuse and Rhine and more especially fortified strongpoints on the latter river, Spanish influence in the Empire and in Europe would be much curtailed. A secure base along the lower reaches of the Rhine also mattered with regard to the conduct

premacy, 1585-1713 (London, 1997), 23-24; such deliberations took place against the backdrop of fears of 'decline', see J.H. Elliot, 'Self-Perception and Decline in Early Seventeenth-Century Spain', *Past & Present* no. 74 (1976), 41-61.

12 G. Parker, *The Dutch Revolt* (Harmondsworth, Mdx. rev. ed. 1985), 225-38.

13 Israel, *Conflicts of Empires*, 26-27. Spínola's campaign of 1605-6 was a notable example, see J. Lefèbvre, *Spinola et la Belgique (1601-1627)* (Brussels, 1947), 25-40; for some operational observations on the Dutch campaigns of the 1590s, see I.L. Uijterschout, *Beknopt overzicht van de belangrijkste gebeurtnissen uit de Nederlandsche Krijgsgeschiedenis van 1568 tot heden* (The Hague, 1938), 65-85.

14 For the Dutch strategy see G. Parker, 'Why Did the Dutch Revolt Last So Long?', *Transactions of the Royal Historical Society*, 5th ser. xxvi (1976), 59-60.

The *Fossa Eugeniana* in the modern landscape, Wikimedia Commons, CC BY-SA 4.0.

of the war against the Dutch by other means. Regional strongholds here were increasingly seen as a useful tool of economic warfare against the United Provinces but also as an instrument to cajole or coerce unfriendly, neutral or otherwise less than cooperative German states in the north and west of the Empire.[15]

The Twelve Years' Truce, which the two belligerents, war-weary and exhausted, concluded in 1609 prefigured the formal partition of the Low Countries. At the time, however, it was thought to be nothing but a pause in the fighting rather than a prelude to peace negotiations.[16] The fact that Spanish forces and troops of the

15 J.I. Israel, *The Dutch Republic and the Hispanic World, 1606-1661* (Oxford, 1986 (pb)), 217-23; further M. Kaiser, 'Die "Spanische Furie" am Niederrhein?: Spanisches Militär als Besatzung, Bedrohung und Ordnungsfaktor', G. von Büren et al. (eds.), *Weltreich und Provinz: Die Spanier am Niederrhein, 1560-1660* (Petersberg, 2025), 35-42.

16 W.J.M. Eysinga, *De wording van het twaalfjarig bestand van 9 April 1609* (Amsterdam, 1959), 110-55; J. Presser, *De tachtigjarige oorlog* (2 vols., Amsterdam and Brussels, 1963)

States General occupied fortresses in Cleves, Gulick and Cologne lands - the Dutch taking Emmerich and Rees and the Spaniards Wesel and the much fought over Rheinberg, the '*puta della guerra*' ('whore of war')[17]- during the turmoil caused by the Gulick—Cleves succession struggle that commenced in that same year underlined the uneasy nature of the ceasefire. Both sides used these strong points as barriers without formally taking possession of them. [18] With Wesel and Rheinberg in Spanish hands, it opened the prospect of a 'Spanish spur road' from the Rhine towards the *Achterhoek* and the Twente region in the eastern Netherlands.[19]

The end to the fighting in 1609 made it possible for the Spanish authorities in Brussels to contemplate measures to revive commercial life, an urgent necessity given the always precarious state of Spanish state finances. The riverine trade on the Meuse remained important in this context, for even during the war both sides relied on the river for much of the North—South trade; it was also the indispensable export route for coal and iron ore from neutral Liège. But vessels could only ply their trade with *licenten* (also '*verlofgelden*') or permits, and other payments were also required. On the 'Spanish' Meuse, there were toll stations at Roermond and at Venlo for the down- and upriver trade respectively. At both places and also at Maastricht and Grave, ship masters had to pay *convooien*, a contribution towards equipping patrol vessels on the river and for the upkeep of forts and garrisons along it. Similar dues were levied by the Dutch on their part of the river. Neither side, in fact, could forego the revenues thus generated.[20]

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ii, 199-216; P. Brightwell, 'The Spanish System and the Twelve Years' Truce', *English Historical Review* lxxxix, 2 (1974), 270-92; B. García-García, 'Tiempo de paces', id. (ed.), *Tiempo de paces: La Pax Hispanica y la Tregua de los Doce Años* (Madrid, 2009), 77-123.

17 Rheinberg changed hands seven times between 1590 and 1672 (1590, 1597, 1598, 1601, 1606, 1633 and 1672), L. Küster, *Die kurkölnische Festung Rheinberg, ein Spielball fremder Mächte* (Rheinberg, 1940), and U. Geissler, *Die Stadt Rheinberg am Niederrhein und ihre Befestigungsanlagen* (Rheinberg, 1995), 18-21.

18 See Wolfgang Wilhelm to James I, 10 Mar. 1615, LANRW, Kleve—Mark, Akten Nr. 136; see further R. Vermeir and T. Roggeman, 'Implementing the Truce: Negotiations between the Republic and the Archducal Netherlands, 1609-10', *European Review of History* xvii, 6 (2010), 817-33.

19 For the 'military corridors' of the Spanish army (but not this one), see G. Parker, *The Army of Flanders and the Spanish Road, 1567-1659: The Logistics of Spanish Victory and Defeat in the Low Countries* (Cambridge, repr. 1984), 50-79.

20 R. Zijlmans, 'Fossa Eugeniana: Een Schelde—Maas—Rijnverbinding vond 1626: achtergrond, voortraject en onderhandelingen', *Publications de la Société Historique et*

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Under these circumstances the Spanish authorities sought to revitalise the economy of the southern Netherlands and to expand Spain's trade with them and also the Empire, both of which had suffered significant losses because of the Revolt.[21] Canals played a role in their deliberations. Here they could draw on earlier schemes to connect the Meuse to the Scheldt in an effort to strengthen Antwerp's commercial position, long threatened by the Dutch blockade of the river delta and the rise of Amsterdam as a rival trading centre.[22] A significant contribution to this debate was made by a Hispano-Italian engineer, Paolo Francesqui, who in 1611 submitted plans for a canal between Maastricht and Antwerp, combined with major improvements at the coastal ports of Dunkirk and Ostend. Ultimately, Francesqui envisaged diverting much of the Republic's Rhine and Meuse trade to Flanders. The authorities in Brussels took a strong interest in this scheme, but the likely costs and a series of technical problems were formidable obstacles; and Francesqui's design never got off the drawing board.[23]

The Meuse—Scheldt project also raised awkward problems of a political nature which were rooted in the weakness of the surrounding states of the Empire. Maastricht lay in the territory of the prince-bishopric of Liège, which had fallen to the elector of Cologne along with the bishoprics of Hildesheim and Münster in 1612 upon the succession of Ferdinand of Bavaria.[24] The elector was no strong

Archéologique dans le Limbourg cliv (2018), 119-20; J.I. Israel, 'The States General and the Strategic Regulation of the Dutch River Trade, 1621-1636', *Bijdragen en Mededelingen betreffende de Geschiedenis der Nederlanden* xcv (1980), 473-6. For a discussion of the nature and the significance of the Meuse trade before the revolt, see T.L.M. Thurlings, *De Maashandel van Venlo en Roermond in de 16e Eeuw, 1473-1572* (Amsterdam, 1955); for Liègeoise trade see M. Suttor, *Vie et dynamique d'un fleuve: La Meuse de Sedan à Maestricht (des origines à 1600)* (Brussels, 2006), 362-64.

21 G. Parker, 'War and Economic Change: The Economic Costs of the Dutch Revolt', id., *Spain and the Netherlands, 1559-1659* (London, rev. ed. 1990 (pb)), 178-204.

22 For a detailed discussion of such plans see R. Zijlmans, *Troebele betrekkingen: Grens, scheepvaart- en waterstaatskwesties in de Nederlanden tot 1800* (Hilversum, 2017), 402-8; for Antwerp's predicament see J.A. van Houtte, *Economische en sociale geschiedenis van de Lage Landen* (Zeist and Antwerp, 1964), 137-41.

23 Note Francesqui, 'Relatie op den wech van den Nieuwe Vaert', n.d. [c. early 1612], Zijlmans, *Troebele betrekkingen*, app. 5; for a discussion of the plan see ibid., 408-13.

24 E. Ennen, ‚Kurfürst Ferdinand von Köln (1577-1650): Ein rheinischer Landesfürst zur Zeit des Dreissigjährigen Krieges', G. Droege et al (eds.), *Edith Ennen: Gesammelte Abhandlun-*

ruler, but his room for manoeuvre was limited by geopolitical factors. He had to defend a sprawling territorial complex in northwestern Germany and the eastern Low Countries with limited financial and military means against potentially hostile major powers. Unrelenting in his Counter-Reformation zeal, he was closely aligned in this respect with the emperor and the Spanish crown, but he held aloof from the war with the United Provinces. Although a recipient of a Spanish subsidy of *fl.* 20,000 p.a. (later increased to *fl.* 31,000 p.a.), he was nevertheless anxious to remain neutral in any renewed conflict between Spain and the Republic.[25] Too often, his dominions had become the cockpit in the Spanish-Dutch conflict. Too often also, the Spaniards had proved dilatory paymasters - the subject of prolonged diplomatic exchanges between Cologne and the Madrid court - and more often still, Spanish garrisons in Cologne strongholds such as Rheinberg exacted heavy contributions from the local population and caused significant damage there. If a security guarantee by the Spanish crown was difficult to obtain, its troops were even more difficult to eject.[26] The proposed diversion of the Rhine trade, meanwhile, was bound to affect the electorate's toll income - the elector also objected to the Spaniards levelling customs dues at Rheinberg.[27]

A different scheme, more modest yet more consequential, was developed by Gerrit (or Gerard(us)) Haesenvoet, an engineer from Geldern, who in 1618 submitted a project outline for a canal to link land-locked Geldern to the Meuse at Arcen. The motivation was primarily economic - Geldern lay on the river Niers, a tributary of the Meuse, a navigable but hardly profitable waterway. But there was also a strategic consideration. As the Geldern municipal authorities explained

gen zum europäischen Städtewesen und zur rheinischen Geschichte (Bonn, 1977), 487-511.

25 H. Schneider, 'Die Politik des Kölner Kurfürsten Ferdinand (1577-1650) im Dreissigjährigen Krieg', R. Haass and J. Hoster (eds.), *Zur Geschichte und Kunst im Erzbistum Köln: Festschrift für Wilhelm Neuss* (Düsseldorf, 1960), 126.

26 J. Kessel, *Spanien und die geistlichen Kurstaaten am Rhein während der Regierungszeit der Infantin Isabella (1621-1633)* (Frankfurt, 1979), 65-69; for the Cologne military see H. Lahrkamp, ‚Kölnisches Kriegsvolk in der ersten Hälfte des Dreissigjährigen Krieges', *Annalen des Historischen Vereins für den Niederrhein* clxi (1959), 114-45.

27 M. Droege, ‚Die kurkölnischen Rheinzölle', ibid. clxvii-clxviii (1967), 21-47; for the economic ties between the Rhineland and the Low Countries, see B. Kuske, ‚Die wirtschaftliche und soziale Verflechtung zwischen Deutschland und den Niederlanden bis zum 18. Jahrhundert', id., *Köln, der Rhein und das ReichL Beiträge aus fünf Jahrzehnten wirtschaftsgeschichtlicher Forschung* (Cologne and Graz, 1956), 200-56.

to the stadholder of Spanish Guelders, Count Hendrik van den Bergh, a canal of this kind would contribute '*tot de befryhong vande landen* [to the liberation of the country]' from the Dutch threat, but would also be '*profitelick*' for the joint rulers of the Spanish Netherlands, Archduke Albert of Austria and the Infanta Isabella Clara Eugenia, and '*gerieffelick* [practical]' for their subjects.[28]

Economic and military considerations became more tightly enmeshed over the course of the next few years. As Haesenvoet refined his project in consultation with local officials, he also extended it eastwards so that the canal was now to run from Geldern through the Cologne exclave of Rheinberg to join the Rhine there. Cologne consent was therefore needed, and to that end Haesenvoet was despatched to Liège to meet with the elector. Ferdinand remained anxious to preserve his territories' neutrality. Even so, he was swayed by the prospect of the canal as a defensive line against Dutch raiding parties.[29] Similar calculations also motivated Wolfgang Wilhelm, Count Palatine of Neuburg, whom Haesenvoet also seems to have met. The count had secured the Gulick—Berg duchy in 1614, territories which had suffered from frequent incursions by the troops of the States General. The major fortress of Jülich, in fact, had been occupied by Prince Maurits of Orange as a strategic outpost in 1610 and a Dutch garrison remained there, the arrangements of 1614 notwithstanding. As a convert to Catholicism Wolfgang Wilhelm tended to lean towards Spain without, however, wishing to endanger his neutrality '*ut restituta provinciis meis exoptata tranquilitate et pace ... facilius et solidius restitui possit*' ('so that the desired tranquility and peace, restored to my provinces ... can be restored more easily and more solidly').[30]

Wider strategic calculations of this sort had acquired greater urgency because of the end of the Twelve Years' Truce in 1621 and the beginning of what was become

28 Geldern municipal authorities to Van den Bergh, 18 Oct. 1618, as quoted in Zijlmans, 'Fossa Eugeniana', 124. For Haesenvoet's plan and the exchanges between Geldern and van den Bergh, see id., *Troebele betrekkingen*, 413-6, and Pistor and Smeets, *Fossa Eugeniana*, 8-9.

29 Ibid., 9; Kessel, *Spanien und die geistlichen Kurstaaten*, 136-9.

30 Wolfgang Wilhelm to Pope Urban VIII, 20 July 1624, H. Kühn-Steinhausen (ed.) *Die Korrespondenz Wolfgang-Wilhelms von Pfalz-Neuburg mit der römischen Kurie* (Cologne, 1937), no. C36; see further D. Richter, 'Der Übertritt des Pfalzgrafen Wolfgang Wilhelm zum katholischen Glauben in Düsseldorf im Jahre 1614', J. Engelbrecht and S. Laux (eds.), *Landes- und Reichsgeschichte: Festschrift für Hansgeorg Molitor* (Bielefeld, 2004), 117-45.

the Thirty Years' War three years earlier.[31] An additional factor was the death in that same year of the Archduke Albert. As his marriage to the Infanta had remained childless, the Low Countries once more fell to the Spanish crown, and Isabella acted as her nephew's, Philip IV's, governor at Brussels. Spanish officials now dominated even more the councils at Brussels, and they prioritised the interests of the dynasty and of the church.[32] Finances were overstretched, the Spanish state's complex credit and fiscal system remaining its Achilles' heel. Organisationally, too, Spain was ill-prepared for a major campaign against the Republic.[33] Grand plans for an *Unión de Armas* ran into opposition by local and provincial bodies, intent on defending their ancient privileges.[34] The successful offensives in 1622 and 1625, during which Jülich and Breda fell to Spanish armies under Ambrogio Spínola, and the unsuccessful siege of Bergen-op-Zoom had swallowed up considerable funds.[35] In consequence, Madrid decided to concentrate its efforts on the war at sea and to remain on the defensive on land until a new continental alliance with the Catholic princes of the Empire could be forged.[36]

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31 B. Chudoba, *Spain and the Empire, 1519-1643* (New York, repr. 1969), 250-55; J.J. Poelhekke, *'t Uytgaen van den Treves: Spanje en de Nederlanden in 1621* (Groningen, 1960), esp. 150-60; J.I. Israel, 'A Conflict of Empires: Spain and the Netherlands, 1618-1648', *Past & Present* no. 76 (1977), esp. 137-38.

32 For the archducal regime, see Carter, *Secret Diplomacy*, 77-87 and id. 'Belgian "Autonomy" under the Archdukes, 1598-1621', *Journal of Modern History* xxxvi, 3 (1964), 245-59; for Isabella's governorship see P. Janssen, 'De landvoogdij van Isabella, 1621-1633', Blok et al (eds.), *Allgemene geschiedenis* vi, 372-84.

33 Parker, *Army of Flanders*, 139-57; F. Ruiz Martin, *Las finanzas de la Monarquia Hispanica en tiempos de Felipe IV (1621-1665)* (Madrid, 1990), 51-54.

34 A. Dominguez-Ortiz, *El Antiguo Régimen: los Reyes Católicos y los Austrias* (Madrid, 7th ed. 1980), 379-81; J. Israel, 'España y los Países Bajos española durante la época de Olivares (1621-1643)', J.H. Elliot and A. García Sanz (eds.), *La España del Conde Duque de Olivares* (Valladolid, 1990), 119-20.

35 J. Alcalá-Zamora y Queipo de Llano, *España, Flandes y el Mar de Norte, 1639-1639: La última ofensiva europea de los Austrias madrileños* (Madrid, 2nd ed. 2001), 186-90. Between July and October 1622, the siege army at Bergen-op-Zoom lost 36 per cent. of its men, often to desertion or defection, see Parker, *Army of Flanders*, 211.

36 Philip IV to Isabella, 9 Aug. 1626, H. Lonchay, J. Cuvelier and J. Lefèvre (eds.), *Correspondance de la Cour d'Espagne sur les affaires des Pays-Bas au XVIIe siècle* (2 vols., Brussels, 1927) ii, no. 887. For the alliance plans with the Catholic League see R. Rodenas Vilar, *La politica europea de España durante la Guerra de Treinta Años (1624-1630)* (Madrid, 1967), 56-57; R.A. Stradling, *The Armada of Flanders: Spanish Maritime Policy and European War, 1568-1668* (Cambridge, 1992), 39-46.

Just as maritime operations were aimed at the foundations of the United Provinces' economic power, so the defensive posture on land embraced the idea of economic warfare. In fact, the Spanish crown made aggressive use of economic instruments. In July 1625, the authorities in Brussels closed the rivers Meuse, Rhine and Scheldt, and also the Lippe, a tributary which joined the Rhine at Spanish-occupied Wesel, and the Ems along the border between the Republic and the bishopric of Münster. All trade with the '*gherebelleerde Provincien*' was banned. The latter responded in kind, and placed all exchanges of goods and money with the Southern Netherlands under embargo in October.[37]

At the turn of 1625/6, with the war at a stalemate and spooked by news of the Anglo-Danish-Dutch alliance under the Treaty of The Hague of 9 December, the Infanta and her advisers turned their attention to the Rhine—Meuse project with a renewed sense of urgency. A Brussels engineer was sent to confer with Haesenvoet and the Geldern mayors about the route of the canal, an agreed plan then being sent by Adriaan von Hoensbroech, the hereditary marshal of the estates of Guelders, to the two neighbouring princes in March 1626.[38] Both rulers remained caught in a bind. Confessional affinities apart, they needed Spanish protection against depredations by the Dutch and their Protestant allies. But this did not mean that they were prepared to let their territories become theatres of war. Unsurprisingly, Wolfgang Wilhelm, now in possession of his Jülich fortress again, pressed for the canal to link up with the Rhine as far downstream as possible ('*sowait es immer moglich hinabwarts*'), in other words as far north of his Gulick—Berg dominions as was practicable.[39] Even this brought no real relief, and throughout the next years,

37 *Ordinatie Ons Heeren des Conincx, inhoudende verboot van den Coophandel mette gherebellerende Provincien* (Brussels, 1625), https://books.google.co.uk/books?id=bCXVrzpIaH8C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false; see also Alcalá-Zamora, *España, Flandes y el Mar del Norte*, 184-86; for an impression of the blockade on Rhine commerce, see H. Münker, *Die Weseler Schiffahrt vornehmlich zur Zeit des spanisch-niederländischen Krieges: Ein Beitrag zur Verkehrsgeschichte des Niederrheins* (Wesel, 1908), 91-94.

38 Hoensbroech to Geldern mayor, 22 Mar. 1626, Pistor and Smeets, *Fossa Eugeniana*, 10, n. 51. For Hoensbroech see R. Verhuven, *Schloss Haag bei Geldern und seine Besitzer* (Geldern, 1952), 17-18; and further H.-W. Langbrandtner, 'Adel in den rheinische Territorien: Eine Skizze zur Typologie des rheinischen Niederadels', M. Gussone and P.K. Weber (eds.), *Zwischen Macht und Ohnmacht: Spielräume adliger Herrschaft im frühneuzeitlichen Rheinland* (Bielefeld, 2020), esp. 50-71.

39 Wolfgang Wilhelm to Isabella, 9 June 1626, LANRW, Jülich-Berg II, Nr. 3015.

his territories suffered from '*continuirender einlagerung*' of foreign troops and the subsequent '*total ruin despoliation und desolation*.'[40]

The dilemma was more acute for Ferdinand of Cologne. A Spanish security guarantee was needed urgently since the Republic's Danish allies were pushing towards his northwestern possessions around Osnabrück and Hildesheim in the summer of 1626. Conversely, a comprehensive Spanish victory over the Dutch would reduce Cologne's alliance value to the Madrid court, and the elector might suffer, both, an end to subsidies and the continued presence of Spanish troops in his territories. In the summer of 1626, in fact, two senior Cologne clerics, Arnold von Bucholtz and Arnold von Wachtendonck, had been dispatched as envoys to Brussels to negotiate compensation payments for spoliations by Spanish troops in various Cologne towns.[41] From the elector's perspective, 'the Low Countries must remain divided and not let either the one or the other become its master' ('*Die Niderlanden müessen dividiret bleiben und einen so wenig als andern Meister werden lassen*').[42]

For Ferdinand, there was another consideration. The extant archival materials do not allow for any firm conclusions, but it seems likely that during his meetings with Isabella's two emissaries, Ottavio Visconti, conte di Sforza, a senior courtier at the archducal court and frequently employed on diplomatic missions, and Giovanni de Medici, marchese di Sant'Angelo, '*huomo della geometria, aritmetica e cosmografia dottissimo*'[43] and now a general in the Spanish forces, the prince-bishop realised that a yet more ambitious scheme was under consideration at Brussels. Itself drawing on the various earlier projects by Francesqui, Haesenvoet

40 Wolfgang Wilhelm to Ferdinand of Cologne, 22 Jan. 1631, ibid., Jülich-Berg II, Nr. 3095,

41 Bagno to Barberini, 22 Aug. 1626, B. de Meester (ed.), *Correspondance du nonce Giovanni Francesco Guidi di Bagno (1621-1627)* (2 vols., Brussels, 1938) ii, no. 1618; for Spanish depredations in and around Rheinberg see M. Dicks, *Die Abtei Camp am Niederrhein: Geschichte des ersten Cistercienserklosters in Deutschland (1123-1802)* (Moers, repr. 1978), 469-70. Bucholtz was a privy councillor and prior at Hildesheim, Liège and Tongeren, Wachtendonck dean of Liège cathedral; both were frequently employed on diplomatic missions, see Meester (ed.), *Correspondance* i, 13, n. 4 and 378, n. 2.

42 Ferdinand to Maximilian of Bavaria, 20 June 1626, as quoted in Kessel, *Spanien und die geistlichen Kurstaaten*, 190, n. 54; Schneider, 'Politik des Kurfürsten Ferdinand', 127-28.

43 According to Giovanni Seraglia, a veteran of the Spanish-Dutch wars, as quoted in Cornelissen, 'Maas- en Rijnkanaal', 196.

Lidar image of the Fort Royal at Lingsfort,
https://www.geoportal.nrw/?activetab=map#

and others, this was a plan probably developed by Jan van den Wouvere, a polymath scholar and energetic *Commissaris van Financiën* at the Brussels court. An official 'with real strategic and political vision'[44], he considered Spanish dominance in Europe indispensable to the order, prosperity and stability of the Low Countries. As finance commissioner he had also overseen the recent works on the harbour facilities at Dunkirk; and he had involved himself in the economic measures against the Dutch Republic and so had a clear appreciation of the strategic utility of the various canal projects. Van de Wouvere's scheme consisted of two parts. The first of these was the old idea of a Meuse—Scheldt canal from Maastricht to

44 Jonathan Israel's apt assessment, id., *Conflicts of Empires*, 46. For Van de Wouvere, known to Spanish officials as Juan Voverio, and his works at Dunkirk, see Alcalá-Zamora, *España, Flandes y el Mar de Norte*, 101-2. This was a (brief) period of grand projects, see A. Domínguez-Ortiz, *Politica y Hacienda de Felipe IV* (Madrid, 1983), 19-33.

Bilzen on the Demer, which river was to be widened down to Hasselt, Aerschot and Mechelen where it joined the Scheldt, '*famoso rio de Flandes y Brabante*.'[45]

The second part was altogether more ambitious. It was nothing less than the wholesale diversion of the Rhine towards the Meuse 'whereby one part of Holland shall be drained and another drowned' ('*por donde Olanda quedaria desislada de una parte y ahogada por otra*'). Two officers, a Captain Van de Sterre and Willem Diericx, had alerted Van de Wouvere to the fact that during the winter months the Rhine was prone to bursting its banks at Uerdingen, a Cologne possession. In consequence of this, smaller rivers and aquifers rose, and this had caused significant damage to the fortifications at Moers, a Dutch exclave but neutral under the 1609 arrangements ('*rompido el Rhin sus diques a Ordingen y cubriendo el país, haber maltratado las fortificaciones de Meurs*').[46] They also suggested that a bend of the Rhine further downstream, near Neuss, offered a better opportunity for joining Rhine and Meuse ('*que había otros pasajes más apropósito para juntar los dos ríos Rhin y Mosa*'). From Neuss, Van de Wouvere suggested, the Rhine, through the skilful use of cuts and dams, could be diverted towards the river Niers at Geldern, from where it would follow the course of that river north-westwards to its juncture with the Meuse at Gennep. Although a small river, the Niers was 'well

45 Anon. [Van de Wouvere], 'Relaçion tocante las obras de los canales propetuestos a hazer entre lose rios Rin y Mosa, y tambien entre la dicha Mosa desde Mastrique al rio Demer', Alcalá-Zamora, *España, Flandes y el Mar de Norte*, app. 5. An abridged French translation is in Lonchay (ed.), *Correspondance* ii, no. 960. The original in the archives at Simancas is a clean copy by Antonio Anselmo, a lawyer from Antwerp, see Zijlmans, *Troebele betrekkingen*, app. 6, n. 9.

46 Anon., 'Relaçion', Alcalá-Zamora, *España, Flandes y el Mar de Norte*, app. 5. Van der Sterr was an infantry officer with the Spanish army, them bivouacking near Hüls; Diericx commanded a company of mounted arquebusiers, see Zijlmans, *Troebele betrekkingen*, 642, nn. 16 and 17. A deputation from Moers negotiated at Brussels to secure the county's continued neutrality, Moers deputation to Spínola, n.d. [Nov. 1621], LANRW, Oranien-Moers, Nr. 19a; see further, H. Preuss, 'Moers in oranischer Zeit (1601-1702)', M. Wenske (ed.), *Moers: Die Geschichte der Stadt von der Frühzeit bis zur Gegenwart* (2 vols., Cologne abd Vienna, 2005) i, 282-91. Although by then some distance away from the Rhine, Moers was situated in a silted up prehistoric arm of the Rhine, and so was prone to flooding in winter, see H. Rosenberg, *Natur- und Kulturlandschaft in der Grafschaft Mörs* (Rheinhausen, 1928), 18-21; for the extensive fortifications, see H. Boschheidgen, *Die oranische und vororanische Befestigung von Mörs* (Moers, 1917), 30-37, and H. Preuss, 'Der Bau der oranischen Befestigung von Schloss und Stadt Moers', M. Wensky (ed.), *400 Jahre oranische Befestigung von Schloss und Stadt Moers, 1620-2020* (Moers, 2020), 17-44.

suited to receiving all the water of the Rhine' ('*muy dispuestos a recibir toda el agua del Rhin*') and, using the natural gradient, to take it to the much lower-lying Meuse. The costs for such a vast engineering project were estimated to be around *fl.* 2 millions ('*dos milliones de oro*'), and the construction time around seven or eight months.[47]

'Draining and drowning' the Dutch Republic was strategy on a vast scale, combining economic and military objectives. It opened up the prospect of diverting all the Rhine trade towards the Meuse and to Brabant and Flanders as the lower reaches of the river would silt up. It would cut off the United Provinces from one of their most important markets and from their chief suppliers of vital resources such as timber and ore, which would now be accessible to traders in Liège and Maastricht. In this manner the Southern Netherlands would be restored as the commercial hub of West European and overseas commerce. At the same time, the volume of water that would now be carried towards the Meuse would cut off and even wash away many of the fortresses downstream on the 'Dutch' Meuse, places such Tiel, Gorinchem and all the way to Dordrecht. Conversely, if the new canals were properly fortified - given that the *Fossa Eugeniana* was to have forts and redoubts along its course a reasonable assumption - they would furnish a form of Spanish barrier that would shield the Habsburg Low Countries and the smaller German princes who moved in Madrid's orbit.[48]

The Infanta Isabella, Cardinal Alonso de la Cueva, the intransigent Spanish envoy at Brussels[49], and Spínola, the commander of the Spanish forces in the Low Countries, arguably the three most significant political figures in the Spanish

47 Anon., 'Relaçion', Alcalá-Zamora, *España, Flandes y el Mar de Norte*, app. 5. Israel, *Conflicts of Empires*, 47-48, misreads the plan by suggesting that the diverted Rhine would flow into the Meuse at Venlo using Haesenvoet's projected canal to connect Geldern to the Meuse. But this seems to conflate, in part, the later outcome with the original intention of the plans.

48 The idea of a 'barrier' of course was a later concept, referring to the Spanish (and then Austrian) fortresses along the Franco-Flemish border, which were financially and materially supported by the Dutch Republic, see R. Geikie, *The Dutch Barrier, 1705-1719* (Cambridge, 1930).

49 De la Cueva was recalled from Venice in 1618 because of his involvement in the 'Spanish conspiracy'; he exceeded his welcome in Brussels, too, and in 1632 was sent to Rome, Philip IV to Isabella, 24 June 1632, Lonchay (ed.), *Correspondance* ii, no. 1894; further J. Lefèvre, 'Les ambassadeurs d'Espagne à Bruxelles sous le régime de l'Archiduc Albert', *Revue belge de philogie et d'histoire* ii, 1 (1923), 75.

Netherlands seized upon the strategic potential of Van den Wouvere's plans. They were a 'most glorious undertaking' ('*imprese gloriorissime*'), noted one well-informed diplomat with a profitable sideline in portraiture, Pieter Paul Rubens. Diverting the Rhine ('*fiumi derivati del Reno*') from its old bed would eventually leave the Republic hamstrung in its warfare, whereas the Spaniards would be able to assert themselves '*per forza*'.[50]

The Brussels government appointed Sant'Angelo to supervise both canal projects - he had played a significant role as chief engineer during Spínola's siege of Breda by turning their own inundation tactics against the Dutch.[51] How to finance the project nevertheless remained a problem. The *nunzio rhenano* at Cologne noted the extreme weakness of the Spanish military position in the region, '*non solo per la penuria del danaio*', but also because of a general exhaustion of resources.[52]

There were also diplomatic hurdles to overcome. Since the projected Rhine diversion touched on Cologne territory, the elector's consent was required, and perhaps some form of compensation for him for the loss of toll revenues. The considerable burden the Spanish garrisons placed on his territories had caused some friction already, and now Cologne's riverine commerce had been dealt a major blow by the Spanish river blockade. For this, too, Ferdinand was seeking redress. To complicate the task before Isabella's diplomats, the Infanta also pressed ahead with the scheme for an alliance with the Catholic League in Germany. When, in August 1626, after the Dutch capture of Oldenzaal in Overijssel, it became apparent that the emperor and the leading princes of the League would not enter the war against

50 Rubens to Dupuy, 24 July 1626, M. Rooses and C. Ruelens (eds.), *Correspondance de Rubens et Documents Épistolaires concertant sa vie et ses ouevres* (6 vols., Antwerp, 1900) no. 405; for Rubens' role as a diplomat see J.P. Le Flem, 'Un artista-diplomática en el tiempo de Olivares', Elliot and García Sanz (eds.), *España*, 161-92, and M. Auwers, 'Pieter Paul Rubens als diplomatiek debutant: Het verhaal van een ambitious politiek agent in de vroege zeventiende eeuw', *Tijdschrift voor Geschiedenis* cxxiii, 1 (2010), 21-33.

51 Zijlmans, 'Fossa Eugeniana', 132; M. Devèze, *L'Espagne de Philippe IV* (2 vols., Paris, 1970), 103.

52 Carafa to Barberini, 21 Aug. 1626, J.J.T. Wijnhoven (ed.), *Nuntiaturberichte aus Deutschland, nebst ergänzenden Aktenstücken: Die Kölner Nuntiatur*, vii, 1, *Nuntius Pier Luigi Carafar (1624 Juni – 1627 August)* (Paderborn, 1980), app. IV, no. 10. Isabella received 950,000 *ducats* from Madrid which would help to alleviate '*la triste situation*', Isabella to Philip IV, 9 Sept. 1626, Lonchay (ed.), *Correspondance* ii, no. 901.

the United Provinces, the Brussels government concentrated on securing consent for further, stronger measures to damage the Dutch economically.[53]

This shift affected Ferdinand of Cologne's position. He could not obstruct Spanish plans for economic warfare against the Republic, but he could force Brussels to give up the scheme of diverting the Rhine. By contrast, a canal from Rheinberg to the Meuse and from thence, if the Spanish authorities so chose, to Antwerp, would leave Cologne commerce its old Rhine route while also opening the prospect of new links to Liège and beyond to Flanders and Antwerp. The hoped for uplift for the Flemish economy, moreover, would never materialise unless the canal was built, which, in turn, placed Cologne in a strong position to secure concessions. Not the least, Ferdinand could expect significant income from dues and tolls levied on the canal traffic at Rheinberg. His preference for the Low Countries to remain '*dividiret*', then, made sound strategic sense.[54]

For all his relative weakness, Ferdinand was prepared to take risks. Despite the shift in Isabella's diplomacy in August 1626, the Spaniards had not yet given up on Van de Wouvere's Rhine diversion scheme. On the contrary, a recent landscape archaeological survey would suggest that Spanish army engineers in fact had begun construction work near Neuss.[55] Certainly, Johann Christoph von Preysing, one of the Brussels envoys of Ferdinand's brother, Maximilian of Bavaria, was under the impression that work for a canal 'from the Rhine at Neuss towards Geldern and Venlo, and from there up the Meuse' ('*auß dem Rhein bey Nuyß auf Geldern und Venloo, von danen die Maaß hinauf*') had commenced.[56] The papal

53 Isabella to Philip IV, 12 July 1626, Lonchay et al. (eds.), *Correspondance* ii, 271; Kessel, *Spanien und die geistlichen Kurstaaten*, 206-7; for the effect of Oldenzaal on the German princes see. e.g., D. Albrecht, *Die auswärtige Politik Maximilians von Bayern, 1618-1635* (Göttingen, 1962), 171-72.

54 Ferdinand to Maximilian I, 20 June 1626, as quoted in Kessel, *Spanien und die geistlichen Kurstaaten*, 190, n. 54; see further Israel's cogent analysis of Ferdinand's policy, id., *Conflicts of Empires*, 51-52; also Geissler, *Rheinberg*, 122-23, on local expectations. By contrast, Kessel, *Spanien und die geistlichen Kurstaaten*, 206-9, and Veenendaal, 'Fossa Eugeniana', 13-15, suggest that the elector sought to 'obstruct' the Spanish plans.

55 See Zijlmans, *Troebele betrekkingen*, 649, who identifies a c. 3-4 meters wide and 5 meters deep ditch in the Reuschenberger Busch on the southern edge of Neuss as the remains of that work.

56 Preysing diary, 23 Aug. 1626, C.M. von Aretin, *Bayerns auswärtige Verhältnisse seit dem Anfang des sechszehnten Jahrhunderts* (Passau, 1839), app. 42.

nuncio, Francesco Guido di Bagno, also reported at that time that the ambition of the Brussels government was still to divert the Rhine towards the Meuse and to drown places such as Dordrecht further down that latter river; and his colleague at Cologne informed the Vatican that the *Infanta* had, in fact, given orders '*per condurre un fiume dentro la Mosa.*'[57]

In its actions, if not in its words, Brussels simply ignored the Elector of Cologne. Much to Ferdinand's annoyance, the Spaniards had sent four regiments of foot and thirty companies of horse to Kempen and Uerdingen at the northern edge of his territories. Spínola dismissed complaints by the Bavarian and Cologne envoys by asserting that the 'situation and present necessities of war simply demanded' ('*die gelegenheit und ietzige notturfft des khrieges solches simpliciter erfordere*') the troops taking quarters in those parts. Renewed complaints by the elector were met with 'no or even bad [answers]' ('*dabei nichts oder gar schlechtes erhalten [habe]*').[58] Under these circumstances, it seems, Ferdinand took a gamble. The excavations at Neuss had commenced 'without consultation and consent of the elector' ('*one Begrueß- und verwilligung deß Churfürsten*'), and the work would continue unless he forced Brussels to abort it. To that end he responded to the latest Spanish imposition 'with troops and the erection of a redoubt at Neuss' ('*mit volck und aufwerffung einer Schanß bey Nuyß*'). The move was risky. The small Cologne force could scarcely hope to prevail against the larger and well-equipped Spanish troops if it came to any actual fighting. Ferdinand's calculated risk nevertheless paid off. Perhaps the prospect of Isabella's battle-hardened soldiers brawling with her *de facto* allies was enough to moderate her and her advisers. By mid-September, they promised to withdraw the troops, stop the work at Neuss and consult with Ferdinand over the most suitable course for a canal, one that would

57 Bagno to Vatican, 22 Aug. 1626, Meester (ed.), *Correspondance de Bagno* ii, no. 1618; Carafa to Barbarini, 24 Apr. 1626, Wijnhoven (ed.), *Nuntiaturberichte* vii, 1, app. IV, no. 7; see also Israel, *Conflicts of Empires*, 48-49.

58 Preysing diary, 15-16 and 26 Aug. 1626, Aretin, *Bayerns auswärtige Verhältnisse*, app. 42. The Cologne envoys also stressed that the Spanish presence was causing ‚*große alienation von Spania*' amongst the local Catholic population, diary, 9 Sept. 1626; see also F. Nettesheim, *Geschichte der Stadt und des Amtes Geldern unter Berücksichtigung der Landesgeschichte nach authentischen Quellen* (Kevelaer, 2nd ed. 1963), 205, and D. Hangebruch, 'Die kurkölnischen Städte und Ämter Uerdingen und Linn im 17. und 18. Jahrhundert', R. Feinendegen and H. Vogt (eds.), *Krefeld: Die Geschichte einer Stadt* (5 vols., Krefeld, 1998-2010) ii, 395.

Fossa Sanctæ Mariæ, quæ et Eugeniana dicitur vulgo De Nieuwe Grift, from Willem and Johan Blaeu, *Theatrum Orbis Terrarum, sive Atlas Novus in quo Tabulæ et Descriptiones Omnium Regionum* (Amsterdam, 1645), University of California, Wikimedia Commons, CC-PD-Mark.

spare his Cologne lands as much as possible. Already at the end of the month, the Bavarian envoy reported on '*des spanischen Volcks*' removal from their current billets to a new camp near Issum, in the far north of the Rheinberg exclave, now under the command of Hendrik van den Bergh.[59]

The move was significant not only as regarded relations between Brussels and Bonn. For the encampment at Issum, a little beyond the line of Haesenvoet's projected canal, was clearly intended to shield construction work there against Dutch raids. Around the same time, in the middle of September, Sant'Angelo, the Infanta's engineer, and Ferdinand had in fact agreed on the canal running from Rheinberg, in the northernmost extremity of electoral Cologne, via Geldern to Arcen on the Meuse.[60]

This was, in effect, engineer Haesenvoet's plan of 1618. There was, however, one more complication, one that reflected the complex, 'composite' nature of the Spanish state.[61] In the Southern Netherlands Madrid's centralising instincts, based on Roman law ideas, all too often clashed with the common law insistence on ancient rights and privileges by municipal and provincial authorities. The planned Rhine—Meuse canal was no exception. With its projected Meuse junction at Arcen, some thirteen kilometres (around eight miles) north of Venlo, it threatened the commercial interest of the latter, and Arcen, a small, fortified place, might eventually replace it as commercial and toll centre on the river. Venlo merchants and mayors had vigorously protested against such plans since 1624, and eventually they prevailed on the officials in far-away Brussels - possibly through the liberal use of gift gold cups - to make their town the Meuse-side terminus of the canal.[62]

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59 Preysing diary, 10-12 30 Sept. and 3 Oct., ibid.; Isabella to Philip IV, 9 Sept. 1626, Lonchay (ed.), *Correspondance* ii, no. 904; Israel, *Conflicts of Empires*, 52-53, overlooks the confrontational line taken by Ferdinand. The Spanish troops moved on 19 September, Pistor and Smeets, *Fossa Eugeniana*, 11; Nettesheim, *Geldern*, 387-8.

60 Smeets, 'Fossa Eugeniana', 20; Veenendaal, 'Fossa Eugeniana', 23. Isabella nevertheless admitted that 'certain questions' still needed to be settled, to Philip IV, 22 Sept. 1626, Lonchay (ed.), *Correspondance* ii, no. 909.

61 J.H. Elliot, 'A Europe of Composite Monarchies', *Past & Present* no. 137 (1992), 48-71, remains the *locus classicus*; further H.G. Koenigsberger, *Monarchies, States Generals and Parliaments: The Netherlands in the Fifteenth and Sixteenth Centuries* (Cambridge, 2001), 73-192.

62 Zijlmans, 'Fossa Eugeniana', 125-6. For the rumours of bribery see G.D.L. Franquinet, 'Venlo en de Fossa Eugeniana', *Publications de la Société historique et archéologique de*

Venlo was extensively fortified, and the new course of the canal could therefore be justified on military grounds at any rate.[63]

While Brussels and Cologne officials were still in the midst of settling the final course of the canal, work on it formally commenced on 21 September 1626 with a solemn ground breaking ceremony outside the northern fortress gate of Rheinberg. In the name of the Philip IV, of the Infanta Isabella and that of Spínola, Hendrik van den Bergh, the Spanish stadholder and captain-general of artillery whose small army was now encamped at Issum, thrust his spade three times into the soil, an act then repeated by other senior officers in his entourage. Isabella had insisted that the canal be named *Fossa Sanctae Mariae*, no doubt, to underline her commitment to the re-catholicisation of the Low Countries. Very soon, however, the canal now in progress was referred to as the *Fossa Eugeniana*, though in contemporary records it was also known as '*Nije Fhaert*' (or '*Vaert*'), '*de Gelderssche Grifft*', '*Mariengrift*' or simply as '*de Grifft*'.[64]

By October, some 6,000 labourers, mostly drawn from the local rural population, but also from further afield, from Artois, Hainaut and Flanders, had been assembled to commence work at seventy points along the designated route. This labour force was augmented by around 2,000 soldiers, mostly Spanish and Italian infantry from the Palatinate, partly to ensure discipline among the civilian labourers and partly to enable them to augment their usually irregular and insufficient pay, the customary fate of soldiers in Spanish service.[65] Although the *Fossa Eugeniana* was a more modest project than Van de Wouvere's original river diversion scheme, it was still an engineering project of considerable proportions,

Limbourg xxviii (1891), 229-34. There had been tensions between Venlo and Arcen authorities in connection with warehouses at Arcen since the early fifteenth century, S. Frankewitz, 'Geldern - Arcen - Venlo: Gewohnheitsrecht contra Stadtrecht', M. Nicolay-Panter et al. (eds.), *Geschichtliche Landeskunde der Rheinlande: Regionale Befunde und raumübergreifende Perspektiven. Georg Droege zum Gedenken* (Cologne, 1994), 290-303.

63 For a discription and plans of the fortress see M.J.J. Bergevoet, 'Venlo', J. Balbergen et al. (eds.), *Atlas van historische vestingwerken in Nederland: Limburg* (Utrecht, 1998), 53-61.

64 Veenendaal, ‚Fossa Eugeniana', 20; for the names see Hendriks, ‚Fossa Eugeniana', 91; E.G. Piecha, *Kamp-Lintfort im Spiegel der Geschichte: Vom Entstehen und Werden einer Jungen Stadt* (Cologne, 1978), 152-59.

65 Philip IV to Isabella, 30 Sept. 1626, Lonchay (ed.), *Correspondance* ii, no. 910; Cornelissen, 'Fossa Eugeniana', 198; H. Smeets, 'Fossa Eugeniana', Dassel and Plötz (eds.), *Fossa Eugeniana*, 22.

all carried out with hand tools, wheelbarrows and carts. It was estimated at the time that monthly construction costs would come to around *fl.* 50,000. Van den Bergh was appointed as '*Contrerolleur van [de] nieuwe canael tusschen den Rhyn ende Maes*', with Sant'Angelo superintending the actual work, assisted by five experienced engineers.[66]

Its defensive structures were the key feature of the canal which covered a distance of 45 km (nearly 28 miles). The fortresses of Rheinberg and Venlo guarded it at either end; in its middle section stood Geldern, which the stadholder Van den Bergh considered the strongest fortress in Spanish Guelders.[67] Two dozen smaller forts were placed at regular intervals along the whole length of the canal, twelve on either side of Geldern. All but one were on the southern side of the waterway; all but two were smaller redoubts with earthen ramparts, palisades and half-bastions, designed to house around sixty guards in fifteen barracks. The other two, placed at the half-way points between the three fortresses were larger constructions, so-called '*forts royales*' (or '*Regalforts*'), with proper bastions, watch towers and barracks for 500 men. They had draw-bridges across the canal, though some of the smaller forts also seem to have been thus equipped in order to service existing roads. One of the two larger forts, that at Lingsfort, near Arcen, was a double fort, straddling the canal and with one half on its northern side.[68]

This chain of twenty-four forts and three fortresses was a formidable barrier. Significantly, a recent landscape archaeological study has identified a number of redoubts some distance to the north of the canal. Some of these may have been erected to provide cover for Van den Bergh's army camp at Issum, but they also suggest that a broader fortress belt studded with strongpoints on and beyond the canal was intended.[69]

66 Pistor and Smeets, *Fossa Eugeniana*, 10.

67 See E. Ebe-Jahn, *Geldern eine niederrheinische Festung* (Kevelaer, 1966), 85; for a discussion of the fortifications in the early seventeenth century ibid., 83-90; for illustrations and plans see P.H. Meurer, *Topographia Gelriae: Ein Katalog der historischen Pläne und Ansichten von Stadt und Festung Geldern* (Geldern, 1979), 49-70.

68 For a detailed description of the surviving forts and their original dimensions see Pistor and Smeets, *Fossa Eugeniana*, 19-65; see also H.J.J.F. Smeets, 'Fossa Eugeniana', Baalbergen et al. (eds.), *Atlas Limburg*, 53-62.

69 R. Paulussen, ‚De Fossa Eugeniana: een Spaans kanaalplan met een tunnelvisie. Een landschapsarchelogische studie naar het ontstan en functioneeren van een zeventiende eeuws kanaal tussen Arcen en Rheinberg' (2015), https://www.researchgate.net/publicati-

The Lingsfort *fort royal* also had a triple sluice, that at Rheinberg a double chamber.[70] As they surveyed the projected course of the canal, Sant'Angelo's engineers soon realised the need for locks to manage its waterflow. Earlier assumptions that, once completed, the new waterway would find its own 'natural' water level proved somewhat naive. The middle section of the canal lay 25 (Rhenish) feet (c. 7.84 metres) above the level of the Rhine, Sant'Angelo told Rubens, and that river lay 32 feet (c. 10 metres) above the Meuse, so that at its highest point the canal was some 60 feet (nearly 18.83 metres) above the level of the Meuse. All of this made the triple sluice at Lingsfort necessary (- the watershed lay just a little south of the Cistercian monastery of Kamp).[71]

There was another geophysical problem. Along the canal's middle and, more especially, its western section (across Walbeck heath) the soil substructure was sandy, and continuous loss of water had to be expected. To ensure unrestricted navigability at all times, water from the river Niers at Geldern would have to be used to keep the *Fossa* well supplied. An explanatory note on a contemporary map of the canal by Michael Floris van Langeren left no doubt on that score: 'So giving is the Niers that it fills the canal and its sluices with its water both ways' ('*Tam dives Nersa est: fossam et cataractas fossae aqua sua utrimque implet*').[72] Given such logistical challenges, some contemporary observers, such as Hug Grotius, took a sceptical view of the undertaking. Information received from Rubens convinced him that Brussels officials had grown 'doubtful on account of the unevenness of the terrain in between [Rheinberg and Venlo] … so that the water may not be kept in except by sluices' ('*dat zij despereren om de ongelijckheyt van tusschen-leggende*

on/277712068_De_Fossa_Eugeniana_een_Spaans_kanaalplan_met_een_tunnelvisie.

70 V. Lyhme, ‚Die vermessungstechnische Aufnahme der Doppelschanze Lingsfort', Dassel and Plötz (eds.), *Fossa Eugeniana*, 110-12.

71 Rubens to Dupuy, 18 Feb. 1627, L. Huet (ed.), *De brieven van Rubens: Een bloemlezing uit de correspondentie van Pieter Paul Rubens* (Antwerp. 2006), no. 62; Dicks, *Abtei Camp*, 468, n. 19. For a profile of the route see Paulussen, 'Fossa Eugeniana', 24.

72 The map of 1627 is reproduced in Pistor and Smeets, *Fossa Eugeniana*, 66-67 and 69-70 (for explanations); H.A.M. van der Heijden, 'Nogmaals Fossa Eugeniana', *Caert Thressor: Tijdschrift voor de geschiedenis van de kartografie in Nederland* xvii, 2 (1998), 25-31. For a technical discussion of the sluices and aspects of water management, see W. Dassel, 'Wasserführung und Schleusentechnik beim Bau der Fossa Eugeniana', id. and Plötz (eds.), *Fossa Eugeniana*, 101-5. The sluice at Rheinberg is the only one remaining, D. von Detten, ‚Die Schleuse der Fossa Eugeniana in Rheinberg, Kreis Wesel', Rheinisches Landesmuseum, *Ausgrabungen im Rheinland 1983/84* (Bonn, 1985), 224-28.

gronde … , soodat het water niet en zal zijn te houden dan van sluysen').[73]

The waterway was to have a uniform depth of 138 cm, and was designed for shallow-draft barges. Its width, initially narrow at 3.31 metres, was to be increased in two further phases over the course of the construction work to, on average, 24.75 metres.[74] The surviving sources are sketchy but work, except during the winter months, seems to have progressed steadily throughout 1626 and 1627. The '*novo canale*'[75] was advanced enough for the *Infanta* to be tempted to visit the new canal. In June she visited Scherpenheuvel, a place of pilgrimage near Diest, endowed and much favoured by her; and from there, accompanied by a sizeable entourage which included Cardinal de la Cueva and Spínola, she toured the Upper Quarter of Guelders, arriving at Geldern on 19 June. On the following day, this time accompanied by von Hoensbroech, she rode along the canal to Rheinberg to inspect the works there, returning that same evening, before heading to Roermond on the 21st. Here she received deputations of local notables and officials, to whom she promised compensation for the disruptions and loss of land as a result of the canal work: '*las tierras que se tomaran se pagaran*' ('the lands taken shall be paid').[76]

Isabella's visit was intended as a morale-boosting propaganda exercise, a fact to which the contemporaneous publication of Van Langeren's map testifies.[77] But the exercise proved to be counter-productive. To protect the archducal party, Van den Bergh moved a considerable portion of his force from its encampment at Issum. With its northern defences thus denuded, the canal became an inviting target for the Dutch, who kept a constant surveillance of the work on the *Fossa*. A raiding party under Thomas Stakenbroeck, a commander of horse, '*soldato vecchio*

73 Grotius to Reigersbergh, 6 Mar. 1627, P.C. Molhuysen and B.L. Meulenbroek (eds.), *Briefwisseling van Hugo Grotius* (17 vols., The Hague, 1928-2001) iii, no. 1138. Grotius, then residing in Paris, was torn between the different parties, H. Nellen, *Hugo de Groot: Een leven in strijd om de vrede, 1583-1645* (Amsterdam, 2007), 329.

74 Pistor and Smeets, *Fossa Eugeniana*, 13.

75 Barberini to Carafa, 1 May 1627, Wijnhoven (ed.), *Nuntiaturberichte* vii, 1, no. 947.

76 Jean-Jacques Chifflet to Bagno, 25 June 1627, Papiers de Chifflet, Bibliotheque Nationale de France, Paris (hereafter BnF), Balouze 162. *Pace* Veenendaal, 'Fossa Eugeniana', 26, the Infanta did not travel from Geldern to Rheinberg on a barge, as Hoensbroech's account makes clear, see Pistor and Smeets, *Fossa Eugeniana*, 15, n. 119.

77 See E. Gachet, *Lettres inédites de Pierre-Paul Rubens* (Brussels, 1840), 128.

passato per tutti i gradi della militia'[78], swept down on the *fort royal* at Lingsfort, capturing it and a number of the surrounding smaller redoubts. The sluices there were destroyed and ramparts levelled, and drainage mills and stocks of timber were burnt, before Stakenbroeck returned to Nijmegen with around one hundred prisoners.[79]

Stakenbroeck's sally was not the first such encounter. The Dutch had kept a vigil on the left bank of the lower Rhine since the previous autumn, and Prince Frederik Hendrik of Orange, Maurits' successor as stadholder since 1625, had moved his army across the Rhine to near Xanten, not far from Van den Bergh's base at Issum, having been authorised by the States General to use his '*eigen inzicht*' ('*his judgment*') 'in respect of the construction work the enemy is carrying out to divert the course of the Rhine' ('*inzake het graafwerk dat de vijand doet om de loop van de Rijn te verleggen*').[80] There was little doubt at The Hague, as Grotius reflected a few years later, '*Fossa ea erat Rheno Mosam jungens, spe ad Scaldim usque ducendi ut ferrum, aes, lignum & qua alia Germanicum fert solum Batavorum commodis intercepta in Brabantiam navigarent*' ('The canal was join Rhine and Meuse, in the hope so to lead them to the Scheldt, so that iron, ore, wood, and other German goods bound for the Dutch be intercepted and be shipped to Brabant').[81]

But on that earlier occasion, it was the Spanish forces that drew first blood. On this occasion, as night fell on 2 October, Van den Bergh, who happened to be Frederik Hendrik's nephew[82], surprised the Dutch. Evading the prince's infantry

78 *Relazione* by Alvise Contarini, n.d. 1626, P.J. Blok (ed.), *Relazioni Veneziane: Berichten over de Vereenigde Nederlanden van 1600 tot 1795* (The Hague, 1909), 178.

79 N. van Wassenaer, *Historisch Verhael alder ghedenckweerdichste geschiedenisse die hier en daer in Europa van 1621 tot 1632 voorgevallen sijn* (21 vols., Amsterdam, 1622-1635) xiii, 43 r and v and 45 r.

80 Secret resolution of the States General, 25 Sept. 1626, https://resources.huygens.knaw.nl/BesluitenStaten-generaal1626-1651/silva/sg/1626/09/25/; for the campaign of 1626, see J.J. Poelhekke, *Frederik Hendrik, Prins van Oranje: Een biografisch drieluik* (Zutphen, 1978), 123-32.

81 H. Grotius, *Grolae Obsidio cum annexis anni MDCXXVII* (Amsterdam, 2nd ed. 1627), 5. The first edition of the pamphlet appeared anonymously earlier that same year, Nellen, *Grotius*, 359.

82 The Van den Berghs were major figures in the politics of the Low Countries. Willem IV van den Bergh was a close associate of Willem of Orange but changed sides in 1583. Hendrik, his younger son, fought with distinction in Spanish service, became stadholder

camp between Marienbaum and Xanten, he struck their cavalry further north, at the Kalkarse Gat at Hönnepel, taking its commander, two captains of horse and a good one hundred cavalrymen as well as four standards and 250 horses.[83] The skirmish was 'of some importance', observed Rubens with a view to the number of prisoners.[84] This was true enough, but it could not hide the fact that neither side was in a position to bring about a decision. In keeping a watch on the ongoing work on *Fossa Eugeniana*, Frederik Hendrik could not strike the Spanish elsewhere. Conversely, in concentrating their forces on the lower Rhine to shield the construction work, the Spaniards weakened themselves elsewhere - hence the seizure of Oldenzaal in July 1626 by a relatively small Dutch force. There were 2,500 men at Rheinberg alone and some 4-5,000 troops along the canal zone.[85]

The stalemate continued when the campaign commenced in 1627. Only this time, it was punctuated by serious setbacks for the Spaniards. Finance remained a problem, so much so that Tomas Lopez de Ulloa, the *pagador general*, had to use his personal credit to purchase silver to pay the troops.[86] Militarily, the initiative then lay with the enemy. Staekenbroek's raid during the *Infanta*'s visit to Rheinberg was the first of its kind. A second occurred in August. When Frederik Hendrik withdrew the bulk of his army to besiege Groenlo (then known as Grol), Van den Bergh set off in pursuit of his uncle to relieve that fortress, and so left the new canal exposed. Dutch scouting parties were not slow to establish this fact, and on 13 August the '*vailliante capiteyn Wolph*', leading around 1,000 men drawn from

of Guelders in 1618, and then changed sides in 1632; for a useful discussion see R.R.A. van Gruting, *Graaf Hendrik van den Bergh: Neef en tegenstander van Prins Maurits en Prins Frederik Hendrik* (s'Heerenberg, 1988); also G. Warthuysen, 'Graf Heinrich van den Bergh: Feldherr im Spannungsfeld des spanisch-niederländischen Machtkampfes am Niederrhein', Historische Vereinigung Wesel (ed.), *Wesel und der untere Niederrhein: Beiträge zur rheinischen Geschichte* (Wesel, 2009), 33-66.

83 Isabella to Philip IV, 14 Oct. 1626, Lonchay (ed.), *Correspondance* ii, no. 920.

84 Rubens to Dupuy, 29 Oct. 1626, Huet (ed.), *Brieven*, no. 60.

85 A. Wittrup, *Aus Rheinbergs vergangenen Tagen* (Rheinberg, 1948), 62-65. To this must be added the garrisons at Wesel and its outposts, at Orsoy, Geldern and Venlo as well as Düsseldorf where a further 850 soldiers were stationed, see Israel, *Conflicts of Empires*, 61; also R.-P. Fuchs, 'Madrid und Brüssel: Überlegungen zur spanischen Bedrohung am Niederrhein (1568 bis ca. 1630)', Büren et al. (eds.), *Weltreich und Provinz*, 28-29.

86 Isabella to Philip IV, 4 Feb. 1627, Lonchay (ed.), *Correspondance* ii, no. 974. Isabella then received 1,650,000 *ducats*, but by June a further 300,000 *ducats* was needed per month, same to same, 28 Feb. and 14 June 1627, ibid., nos. 991 and 1059.

the garrisons at Emmerich, Rees and Schenkenschanz, stormed the other *fort royal* on the eastern section of the *Fossa* between Geldern and Rheinberg. From there all the way to Geldern, all the building materials, timber stocks and workers' huts were burnt, and the raiding party made forty prisoners and captured two artillery pieces.[87] By then, as one of the clerics at the *Infanta*'s court noted, the construction work had come to a halt because of the frequent raids and, more significantly, owing to a lack of funds.[88]

Work resumed in late January of the following year but, although supplies continued to arrive on the construction sites, little progress was made. Dutch raiding parties continued to cause significant damage to the redoubts already completed and finances remained stretched.[89] Worse was to come. In 1629, the Dutch captured s'Hertogenbosch and, more worryingly for the Spanish, Wesel and Büderich on the Rhine, a few miles downstream from Rheinberg, also fell to the enemy in a daring coup.[90] The blockade of the riverine trade had proved ineffective, and in May of that year the Spanish government lifted all restrictions. As for the canal, work there seems to have been completely halted. The labourers, as a later chronicle recorded, had 'run away because of hunger and lack of money' ('*syn verloopen van groote Honger en Mangel van Gelt*').[91] Spanish troops, in fact, were in a 'state of prostration.'[92]

The following years saw further Dutch raids, which again caused significant damage to the earthworks at and around the canal. In July, they captured a '*G[éné]ral de l'armée du Rhin*' in a skirmish at Rossenray, a few miles along the canal from Rheinberg.[93] No doubt, work could have resumed at a later date, had the Dutch not

87 Wassenaer, *Historisch Verhael* xiii, 92 v; for Wolph or possibly Wolff see Veenendaal, 'Fossa Eugeniana', 31, n. 3. This fort royal was at Hoerstgen. Groenlo surrendered on 20 August, Isabella to Philip IV, 4 Sept. 1627, Lonchay (ed.), *Correspondance* ii, no. 1089; Grotius, *Grolae Obsidio*, 9-25.

88 Chifflet to Bagno. 2 July 1627, B. de Meester de Ravenstein (ed.), *Lettres de Philippe et Jean-Jacques Chifflet sur les affaires des Pay Bas (1627-1639)* (Brussels, 1943), 43. Rubens also confirmed the financial difficulties, to Dupuy, 22 Apr. 1627, Huet (ed.), *Brieven*, no. 66.

89 Pistor and Smeets, *Fossa Eugeniana*, 15; Veenendaal, 'Fossa Eugeniana', 35.

90 Isabella to Philip IV, 9 Sept. 1629, Lonchay (ed.), *Correspondance* ii, no. 1473.

91 Diary of Gerhard Basten, c. 1760, Pistor and Smeets, *Fossa Eugeniana*, app. 4.2; for the effect of the seizure of Wesel on shipping see Münker, *Weseler Schiffahrt*, 94-112.

92 Coloma to Villela, 23 Nov. 1629, Lonchay (ed.), *Correspondance* ii, no. 1521.

93 Philippe Chifflet to Bagno, 12 July 1630, BnF, Papiers de Chifflet, Balouze 162.

seized the fortress of Orsoy on the Rhine in close proximity to Rheinberg. That same year, Frederik Hendrik, during his famous campaign along the Meuse, took Venlo, Straelen, Roermond and Maastricht. It was a crucial turning point in the second phase of the Eighty Years' War, and it effectively killed off the Rhine—Meuse canal project. With Venlo in the hands of the States General, it had lost its strategic rationale.[94] As if to underline its uselessness, the Spanish guards at the larger *fort royal* at Lingsfort loosened off three or four canon towards the prince's siege army, but the shots 'fell too short' ('*maer de kogels vielen te kort*').[95] Even the permits on Rhine and Meuse shipping were reintroduced. Brussels could not do without the revenues, whatever the awkwardness of the move.[96]

Later that year, Van den Bergh, the Spanish stadholder, who had been parleying with his uncle about defecting to the United Provinces, finally switched sides; and in June 1633 Frederik Hendrik took Rheinberg.[97] Thus, both termini of the projected Rhine–Meuse canal were now in Dutch hands; and with that, the *Fossa Eugeniana* faded into history. Paupers from the surrounding villages, it was reported in 1633, had by then moved into the abandoned barracks in the various forts and redoubts.[98] No less fitting, perhaps, the archduchess, after whom the canal project was named, died on 2 December 1633 in Brussels.

94 Poelhekke, *Frederik Hendrik*, 372-87; P.J.H. Ubachs, 'De Maasveldtocht van 1632, oorzaken en gevolgen', *De Maasgouw* cii, 1 (1983), 1-24; J.P.G.M. Vaessen, 'Venlo en de Maasveldtocht van 1632', F. Hermans et al. (eds.), *Venlo's Mozaïek: Hoofdstukken uit zeven eeuwen stadsgeschiedenis* (Maastricht, 1990), 167-82.

95 L. Aitzema, *Historie of Verhael van saken van state en oorlog* (3 vols., The Hague, 1657-8) iii, book 12, 6 v.

96 Isabella to Philip IV, 28 Apr. 1632, Lonchay (ed.), *Correspondance* ii, no. 1869.

97 Philip IV to Isabella, 4 Oct. 1633, Lonchay (ed.), *Correspondance* ii, no. 2152; Geissler, *Rheinberg*, 65. The count had been viewed with growing suspicion at Brussels and was accused of heresy, incest (!) and treachery by Spanish officials, State Council declaration, 5 Mar. 1630, Lonchay (ed.), *Correspondance* ii, no. 1584; see further M.G. de Boer, 'Het verrad van Hendrik van den Bergh en de veldtocht langs de Maas (1632)', *Tijdschrift voor Geschiedenis* xiii, 1 (1898), 17-34.

98 Pistor and Smeets, *Fossa Eugeniana*, 16. Sections of the canal at Arcen, now a nature reserve, and at Rheinberg and Kamp-Lintfort survive to this day, Werkgroep Documentaire Fossa Eugenia, 'Lesbrief 1', https://fossa-eugeniana.nl/wp-content/uploads/2022/09/Lesbrief-1.pdf; H.G. Horn, 'Strategisch geplant, praktisch gescheitert', *Archäologie in Deutschland* no. 4 (1998), 64-65.

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It would be tempting to conclude this essay with reflections on the futility of all human endeavour. A major canal project, never completed and then abandoned, can scarcely be claimed as a success. The financial constraints under which the Spanish monarchy operated, and the insufficiency of the manpower and materiel resources at its disposal, combined with the effectiveness of Dutch measures to disrupt the work on the canal, proved insurmountable obstacles. As the explanatory note to Willem Janszon Blaeu's 1642 map of the *Fossa Eugeniana* observed, Rhine and Meuse reached out towards each other, '*mutua se spectant brachia, non coeunt*' – 'the arms stretched out, they could not join.'[99]

And yet, there was more to this aborted canal. The object behind it was sufficiently threatening to impel the Dutch to secure guarantees against any resumption of this or other projects when the war with Spain eventually came to an end. In the Treaty of Münster of 30 January 1648 Spaniards and Dutch agreed not to build new fortresses in the Low Countries, 'nor shall new canals or *fossae* be dug, through which one or other might be hindered or damaged' ('*nec novi canales aut fossae, per quas alter alterum arcere aut sistere queat, fodiantur*').[100]

For the Spanish, the canal was conceived as an ambitious instrument of economic warfare, to complement or replace the river blockade which had proved to be of doubtful value. Nor was this all. The chain of forts and redoubts along the canal and to the north of it, reinforced by three major fortresses, leave no doubt that the *Fossa* was also designed as the main artery of a substantial fortress belt. Its purpose was primarily defensive, to protect Spain's interests and possessions and those of her allies and clients in the region. Overtime, assuming Spanish power recovered sufficiently, it might have served also an operational base for renewed offensives against a more exposed Dutch Republic. It was to give practical meaning to the concept of a zone of political and military dominance. In this sense, it was project befitting the grand strategy of an already declining great power.

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99 This was the third version of the map; the first was published, without the note, in 1629; reprinted in C. Koeman, *Atlantes Neerlandici: Bibliography of terrestrial, maritime and celestial atlases and pilot books* (5 vols., Amsterdam, 1967-71) I, 74, no. 27; see also id., *Joan Blaeu and His Great Atlas* (London, 1970), 63-64.

100 Art. 58 of the *Tractatus Pacis*, 30 Jan. 1648, https://www.lwl.org/westfaelische-geschichte/que/normal/que2603.pdf; see further J.J. Poelhekke, *De vrede van Munster* (The Hague, 1948), 421-57.

Peter Paul Rubens, Isabella Clara Eugenia, c. 1615, National Gallery London, accession number NG3819, Wikimedia Commons.

"We make war more like foxes than lions" Civil War Fortress Warfare

by David Flintham

Summary. Introduction. A Fortified Landscape. Design and Construction. The Siege. Conclusion. Select Bibliography.

Introduction

Whilst reflecting on the Civil Wars which afflicted the British Isles during the late 1630s, 1640s and early 1650s, Roger Boyle, 1st Earl of Orrery, a veteran of the fighting in Ireland, commented that "we make war more like foxes than lions, and you will have twenty sieges for one battle"[1]. In doing so, he highlighted that despite popular opinion, the type of fighting which characterised the conflict was not in the open fields, meadows and moorlands, but in and around towns, castles and fortified houses. Prince Rupert, a commander with a reputation for seeking battle as a first resort, participated in twice as many actions involving attacking or defending fortresses as he did battles, whilst in its first year of campaigning, the New Model Army conducted a dozen sieges and assaults but just two field actions. In Ireland between 1649 and 1650, Oliver Cromwell is credited with capturing 25 towns and castles but did not fight a single battle. The Civil Wars actually started with the storming of Edinburgh Castle in 1639 and ended with the fall of Clough Oughter Castle in County Cavan, Ireland, almost exactly 14 years later. The first 'English' Civil War started with an attack on Hull in July 1642 (although the capture of the Tower of London six

1 Roger Boyle, Earl of Orrery, *A Treatise on the Art of War*, (London: 1677), p. 15

months earlier has a claim on this particular honour) and ended with the fall of Harlech Castle in March 1647[2].

The *Archaeology of English Battlefields* (2012) identified 242 Civil War sieges, of which 223 occurred during the First Civil War and nineteen during the Second Civil War. As some places were besieged more than once, this represents 189 actual siege sites. This compares with 30 major battles in England between 1640 and 1651, and so demonstrates that for every major battle there were eight sieges[3]. But this represents but a fraction of the actual fighting as for every battle there were numerous skirmishes and other minor actions. The same applies to sieges, and for every major siege there were other types of actions involving fortresses including its surrender resulting from an action elsewhere, or its fall following a battle outside its walls. There are a number of instances, such as Peterborough and Stamford in 1643 where the garrison simply withdrew or fled at the approach of the enemy. So, when the number of places that were subject to such 'lesser' actions is added to the number besieged, the total more than doubles. Then, of course, there were the more fortunate places that were fortified but were spared any actual fighting.

The First Civil War (1642-47) can be viewed as a national conflict fought locally. Regional priorities could dominate central strategy, and the war was quite often a convenient excuse for one local faction or another to increase their influence across a region, or even to settle old scores. Opposing armies needed to control territory, and did this by establishing and maintaining garrisons. Such a garrison might be centred on a major urban centre, a key logistical hub in the heart of friendly territory, a centre of wealth and control in its own right and sometimes the base of significant, army-sized forces. Such places would be surrounded by out-lying satellite garrisons (for example, the Royalist capital of Oxford was surrounded by an outlaying ring of seventeen garrisons and fortified houses), in regular communication with the centre, but much closer to the enemy. Closer still would be outposts, often protecting key routes, a base for

2 Dates are given using the Gregorian calendar although the Julian calendar was still in use in England

3 Glenn Foard and Richard Morris, *Archaeology of English Battlefields*, (York: Council for British Archaeology, 2012), pp. 7-8, 127, 175-9; Richard Jeffrey Leese, *Siege Archaeology of the English Civil Wars: Establishing a methodology to unlock the archaeology of attack and defence at early modern siege sites*. Doctoral thesis, (Huddersfield: University of Huddersfield, 2020), pp. 45-6

A TRVE MAPP AND DISCRIPTION OF THE TOWN of Plymouth and the Fortifications thereof, with the wor-kes and approaches of the Enemy at the last Seage: A° 1643
Plymouth Sounde
A Scale of Miles
Wallia
Corn

Fig. 1. Siege of Plymouth. Between 1643 and 1645, Plymouth was the only sizable Parliamentarian possession in the whole of the West Country, and resisted the Royalists on a number of occasions. Wenceslaus Hollar's etching of the Siege of Plymouth (P554) in 1643 shows the original rampart and ditch defences surrounding the town, together with the shore-line Tudor blockhouses. To the north of the town is a line of triangular redoubts connected by a line of ditch-fronted ramparts. The Royalists constructed a ring of siege batteries around Plymouth from which they could bombard the town from the landward side and from across the water as well. Thomas Fisher Rare Book Library, University of Toronto

aggressive patrols exercising control over disrupted territories. Then there were the garrisons within enemy territory, disrupting communication and trade. As the war swung in favour of Parliament, their territorial gains left more and more isolated Royalist outposts which could prove to be a considerable thorn in the side of the local Parliamentarians.

A Fortified Landscape

The Civil Wars typified, albeit on a smaller scale, the European way of waging war during the seventeenth century where the attainment of geographical objectives was of greater importance than the defeat of the enemy's armies and battlefield success alone was no guarantee of overall victory. Parliament and Royalist were equally aware of the need to keep communications open: In 1643, the Parliamentarians attempted to establish a fortified 'corridor' linking Gloucester, Coventry and Manchester, whilst the Royalists attempted one of their own, linking the key recruiting grounds in Wales with Oxford, Newark-upon-Trent and the Royalist north. These two opposing corridors crossed in Staffordshire; with the result that Lichfield was besieged more than once – in December 1642 it was captured by Parliamentarian forces only for it to be recaptured the following spring. This enabled the Royalists to create their corridor to the north, but until the Parliamentarian army in Cheshire had been eradicated, this corridor could not be completely secure. Equally, the Royalist corridor between Oxford and Wales would not be secure with Gloucester in Parliamentary hands. So, towns like Chester, Gloucester, Lichfield, and Newark on Trent had strategic importance. The Royalist failure to capture Gloucester in the summer of 1643 left the city as a thorn in their side for the remainder of the Civil War. The Royalists did, of course, have their own equivalent in Newark on Trent. Situated where the Fosse Way met the Great North Road and bridged the River Trent, Newark guarded the route from Oxford to York and Newcastle, and disrupted Parliamentarian communications across the East Midlands. It is of no surprise, therefore, that the town was besieged three times.

The regional nature of the Civil War meant that fighting could breakout anywhere (with the general exception of the South East and East Anglia, although citizens of Arundel or King's Lynn during 1643 probably felt differently). The approach of war necessitated much activity in building and improving defences, often undertaken by the citizens themselves, and many places took steps to prepare even though, for the time being at least, there was no direct threat. For instance, from November 1641, Gloucester, Shrewsbury, and Stratford-upon-Avon were all repairing existing defences, whilst in June 1642, the citizens of Dorchester and Exeter used Parliament's authority to protect themselves from the Royalists fleeing Somerset.

But it was not just about controlling swaths of territory that necessitated the fortification and garrison of towns throughout the country, and reasons why certain towns might be more heavily fortified or more resolutely defended than another varied. For most towns, the location had more to do with trade, natural resources, or communication, rather than natural defensive potential. So here, it was the man-made defences that took prominence, but even so, natural topographical features could be incorporated. Tudor coastal fortifications aside, the defences of the majority of the places besieged during the Civil Wars were largely medieval (or older) in origin, the majority of these were built or begun by 1300: around this date there were about 640 towns or boroughs in England, and a further 90 in Wales. Of these, 211 in England, and 55 in Wales had some sort of walled defences[4]. But these town walls were not just about protection; they marked the limits of borough authority, and gateways were a convenient place to levy taxes and tolls on travellers, and occasionally, gates were constructed without adjoining walls.

The impact of the Civil Wars was felt right across the British Isles. Even if an area were fortunate enough to escape any actual fighting, the sight of armed men would have been a common one, and who knew where they might turn next. The countryside was stripped for supplies, and once gathered, these would need to be transported. Coastal districts might be subject to the attention of opposing navies or privateers, or occasionally foreign warships too. The propogandists of all sides were not slow to report, and often exaggerate, the activities of the enemy, describing atrocities in gruesome detail, occasionally even inventing them. So regardless of its strategic importance or loyalty, places up and down the country protected themselves, and hundreds of towns, castles, and houses were fortified. But in some locations, this might have been counter-productive, and actually attracted the warring parties:

"The slight retrenching and garrisoning of many towns of no great strength by nature and situation, though it may by nature and situation, though it may serve for the present securing of particular counties, and particular men's estates from plundering parties, yet they are prejudicial to the public, and to the main of the wars"[5]

4 Francis Pryor, The Making of the British Landscape, (London: Penguin Books, 2011) p. 318

5 Joshua Sprigge, *Anglia Rediviva. England's Recovery*, (London: 1647), reprinted (London: Ken

During the sixteenth and seventeenth centuries fortress warfare changed nearly beyond all recognition: the imposing masonry castles and turreted town walls which once had stood almost impregnable were now vulnerable to gunpowder artillery. But as artillery evolved, so too did fortifications. What started as simple artillery fortifications in fifteenth century Italy, the *Trace Italienne*, developed into schemes of ever-increasing complexity across Europe. But in the British Isles, long periods of peace meant that fortress design was considerably behind that of the rest of Europe, and by the outbreak of the Civil Wars, the last major programme of fortress building, that initiated by Henry VIII, was nearly a century before. There were some minor schemes constructed to counter the Spanish threat towards the end of the sixteenth century, and raids by Flemish Privateers in the first decades of the seventeenth, and the defences of Berwick-upon-Tweed continued to be developed until the Union of the Crowns in 1603. But it was only south-west Ireland which witnessed serious fortress building.

In total, some 1,176 places across the British Isles were fortified to some greater or lesser extent during the Civil Wars[6], of which 703 (60%) witnessed some sort of hostile 'action'. Breaking this down by country, there were 725 fortified places in England, of which 417 saw action. In Ireland, the figure was 233 and 110, for Scotland it was 121 and 96, and in Wales, there were 76 fortified places, of which 59 saw action.

250 towns, cities, and ports across England, Ireland, Scotland, and Wales, were fortified. England contributed two-thirds of this with 171. 42 Irish fortresses were towns or ports, whilst in Scotland there were 17, and 20 in Wales. Whilst demonstrating the importance of urban-based garrisons in England, it also shows that the nature of the fighting in Ireland, Scotland, and Wales was generally different from that in England. There are of course exceptions to every rule, but generally, sieges on towns were comparatively rarer in Scotland, and Wales, and also in Ireland until the Cromwellian conquest in 1649-53. The Royalist uprising in Scotland during 1644-46, for example, witnessed several

Trotman, 1984), p. 14

6 This information comes from the Civil War Fortresses Register (CWFR) https://vauban.co.uk/civil-war-fortifications-register-(cwfr), and is as of 01/04/2026. The CWFR is an on-going project, with the reported data being revised continually. The overall list also includes 21 sites mentioned in contemporary documents which are yet to be located

occasions where the Royalists (albeit temporarily) occupied towns and cities, but this was usually only after the respective Government forces had been defeated outside the town's walls.

Castles were the most dominant fortress type in Ireland, Scotland, and Wales. In England, their construction was predominately a rural phenomenon, although in the immediate post-Conquest period, most of the towns in England that had been centres of Anglo-Saxon regional administration had castles imposed upon them, numbering some 48 places across England by the early twelfth century. By the end of the sixteenth century, England might have contained as many as 1,474 castles (this figure includes both urban and rural castles, mottes, ringworks, late-medieval tower houses, and Tudor artillery forts). But by the time of the Civil Wars, most castles had long outgrown their usefulness as defensive structures, and many were ruinous (and had already started to become quarries for the local neighbourhood). But the Civil Wars did not bring about the sudden end of the castle, and instead, the Civil Wars could be seen as their swansong, a time when this decay and decline was briefly paused, and many castles were pressed back into service, despite the fact that "not all castles were fit for use at this time; indeed the majority had undoubtedly passed beyond that stage."[7]

In total, in England during the Civil Wars, some 140 castles were refortified. Of these, 99 were subject to attention by hostile forces. Elsewhere (the figures for hostile attention are bracketed), in Ireland the figures were 72 (32) castles, Scotland it was 71 (61), and finally in Wales it was 39 (31) castles. Churches were also fortified: there was nothing new in this (during the twelfth century Anarchy, for example a number of churches became defensible strongpoints), and during the Civil Wars, 28 English churches were transformed into places of strength.

Like castles, country houses could be of considerable strategic importance, and were commonly owned by leaders of the respective sides who did try to defend their homes, and where the existing brick and stone walls seemed inadequate, reinforcing them with earthworks. Probably the best-known example of this is Basing House in Hampshire which was finally taken by Cromwell in

7 Oliver. H. Creighton, *Castles and Landscapes*, (London: Equinox Publishing Limited, 2005), pp. 52, 133-4; M. W. Thompson, *The Decline of the Castle*, (Cambridge: Cambridge University Press, 1987), pp. 138, 156-7

October 1645. Yet, as one study highlights, the very act of fortifying a country house would draw attention to it, and, as the Committee of Both Kingdoms remarked in November 1644 "We are informed that the enemy is fortifying two houses near Salisbury, viz at Wilton and Goldbourne, which if they are perfected will be of great prejudice to those parts."[8] Of the 725 English fortresses, 192 were fortified houses; fortified manor houses were of far less significance elsewhere in the British Isles. Finally, the oldest site to be transformed into a fortress during the Civil Wars was the neolithic henge site of Maumbury Rings at Dorchester.

Neither side could maintain sizeable field armies and garrisons simultaneously, so assembling an army at the start of a campaign would often mean stripping local garrisons. For instance, the Parliamentarians stripped several garrisons in Lincolnshire in the spring of 1644 to attack Newark where the assembled force was defeated and resulted in a significant strategic shift across county. The Royalist army that assaulted Leicester in May 1645 contained troops stripped from many garrisons, including Evesham which, as a direct result fell to the Parliamentarians on 20 May 1645 "in a storm of fire and leaden hail"[9]. This was a significant loss to the Royalists as, at a stroke, the Parliamentarians had severed the direct line of communication from Oxford to Worcester and South Wales.

Design and construction

On the eve of the Civil Wars, Britain had been more or less at peace for a generation. Whilst many individuals had served in various European armies during the Thirty Years War and several (including Sir Jacob Astley, Sir Thomas Fairfax and Philip Skippon) gained experience of sieges, by and large the knowledge of siege warfare amongst the home-grown soldiery was minimal. Therefore, the three Kingdoms lagged behind the rest of Europe in terms of both actual construction, and the knowledge required to construct and besiege fortresses[10]. Despite the publication of several books on military engineering

8 Peter Harrington, *English Civil War Archaeology*, (London: B. T. Batesford, 2004), p. 60

9 Anon, *Virtue and Valour Vindicated*, (London: 1647)

10 For an overview of European influences on Civil War military engineering see David Flintham, 'They have sent to Holland for Engineers', in Serena Jones (editor), *'Britain turned Germany': The Thirty Years War and its impact on the British Isles*, 1638-1660, (Warwick: Helion and Company

Fig. 2. Richard Clampe's *Plan of the siege of Newark* (1646). Newark on Trent in Nottinghamshire is arguably the best-known fortress-town of the entire Civil War period. It was besieged three time, finally in 1645-46, and it is this siege which is depicted in *A description of the seidge of Newark upon Trent with the fortifications about the Towne as also the forme of all the Entrenchments forts redouts batteries and approaches made against it under the conduct of the Earle of Leven Capt: Genll: of the Scots Army and Coll: Genll: Pointz and Coll: Rosseter commanders in Cheife of the English forces, it begun the 6th of March 1645 and ended the 8th of May 1646. Described by Richard Clampe, Ingenier*. Wikimedia Commons. Original: British Library (maps) 4670 (i)- now 004897722).

written in or translated to English in the years leading up to the Civil Wars[11], generally both Royalist and Parliamentarians armies looked abroad for their military engineers who came chiefly from the Netherlands, and France. As the fighting progressed, home-grown engineers did emerge, but even so the chief military engineer for the New Model Army in 1645 was Peter Manteau van Dalem, a Dutchman. Whilst the focus of many of these was the siege, there were others whose talents were in the design and construction of fortifications.

As outlined previously, the defences of the majority of the places besieged during the Civil Wars were largely medieval in origin, although there were some exceptions including the Tudor forts along the Channel coast and the Isles of Scilly (besieged in 1651, and then re-fortified). Whilst there are a number of instances where these medieval defences were able to withstand lower calibre artillery bombardment (Chester's city wall still bears the scars, for example), generally speaking they required considerable improvement to turn them into places of strength. Initially, this might be repairs to existing walls and re-cutting existing ditches. As happened at Exeter, Leicester and Lichfield, existing towers were strengthened to mount artillery pieces, and the walls loop-holed for musketry. The walls themselves strengthened on the inside: during the siege of Worcester, it was noted that a stone wall lined with up to eight feet of soil (or dung) could still be breached by enemy cannon; to make the wall cannon-proof would require a lining of twenty-feet[12]. Existing gates were reinforced with barricades and *chevaux-de-frise* or even blocked up altogether, as happened in York in 1644. Suburbs were cleared to improve fields of fire and to deny cover to the attacker, and any weak points in the existing defences strengthened with small earthworks.

At the outbreak of the war, many castles, even those in a ruinous state, were

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Limited, 2019), pp. 89-121

11 The most well-known of these are Henry Hexham, *The Principles of the Art Militare, as Practised in the Warres of the United Netherlands*, (1637-40), Robert Ward, *Animadversions of Warre*, (1639) and Richard Norwood, *Fortification, or Architecture Military*, (1640). Also see David R. Lawrence, *The Complete Soldier – Military Books and Military Culture in Early Stuart England*, 1603-1645, (Leiden: Koninklijke Brill NV, 2009)

12 J. W. Willis Bundi (editor), *The Diary of Henry Townsend of Elmley Lovett*, (London: Worcester Historical Society, 1920)

, p. 134

re-occupied and garrisoned, such as Goodrich Castle in Herefordshire, and Restormel Castle in Cornwall, and later Haverfordwest in Pembrokeshire. In some instances, the internal fabric of the castle was repaired, strengthened, or improved: at Chepstow Castle, for instance, musket loops were cut into existing walls, and embrasures for cannon added. Musket-loops were also cut into the walls at Raglan Castle, gun-platforms were constructed at Restormel, whilst an internal bastion-shaped earthwork was constructed at Corfe Castle to provide a view across the village below. Ruthin Castle in Clwyd was described by a local Parliamentarian commander as "ruinous", whilst Lucy Hutchinson wrote of Nottingham Castle: "the buildings are very ruinous and uninhabitable nether affording rooms to lodge soldiers or provisions". Another example is Cambridge (whose castle had been abandoned in the fifteenth century) where the Parliamentarian governor wrote in 1643 "our town and castle are now very strongly fortified being encompassed with breast-works and bulwarks"[13]. Even where the actual fabric of the castle itself was gone, the remaining mounds might be converted into artillery platforms (such as at Huntingdon Castle). Those that had retained a degree of architectural integrity might have walls that "are standing very strong without any decay, only the roofs and leads have been taken down"[14]. Other castles had been previously transformed into domestic country houses with the result that their defensive capabilities were neglected. But all sides took steps to refortify or reuse them, regardless of their state.

By the time of the Civil Wars, existing medieval defences had long ceased to contain urban growth and accounts of Civil War fortifications make regular reference to both constructing new defensive lines to encompass this growth, and the deliberate destruction of suburbs both to improve the field of fire for the defenders and to deny their use as cover by any attacker (something the Royalists initially failed to do at York in 1644, to their cost). Sir Richard Cave, a Royalist fortifications expert, estimated that 20 men could cast up some 12 metres of breastworks in 12 hours[15]; so, based on this estimate, a few hundred

13 F. J. Varley, *Cambridge during the Civil War*, (Cambridge: Cambridge University Press, 1935 (Partizan Press reprint)) p. 104

14 J. Sutherland (editor), *Memoirs of the Life of Colonel Hutchinson, by Lucy Hutchinson*, (Oxford: Oxford University Press, 1973), p. 83; Harrington, *English Civil War Archaeology*, p. 36

15 J. Duncumb, *Collections towards the History and Antiquities of the County of Hereford*, (Hereford: 1894) volume 1, p. 248

men could fortify, albeit simply, a small town in a week. However, this potentially 'amateurish' approach was criticised by the French-born engineer, David Papillon who accused English engineers of making their fortifications "more like hedge-dikes, then [sic] of works and Fortifications"[16].

A more considered approach was promoted by Nicholas Stone (Master Mason to both James VI/I and Charles I), and here, the initial foundations of the rampart were secured by a series of wooden stakes of between 30.48-60.96cm (one and two feet) in height, joined together with bundles of tightly bound brush wood known as a "saucidge". Hammered clay would then be layered behind these saucidges until the required height of rampart had been achieved. Recent archaeological investigations at King's Lynn have found evidence for this method of construction[17].

To turn a town into a fortress would require varying degrees of military engineering expertise, and it is here that the importance of geography becomes obvious. The landscape and town-scape played a significant role in the design and construction of urban defences, and the immediate impact of geography on a fortress was of course, how the local topography was either incorporated into the defences of the town or was the reason for its location in the first place. Many towns were established in naturally defensive positions: perhaps inside the bend of a river (Shrewsbury for example), or surrounded by several water courses (such as Oxford). In other places, a geographical feature would be incorporated into a defensive scheme (the King's Fishpool, although man-made, formed part of the north-eastern portion of York's Medieval defences).

However, what might be a benefit to the defender (high ground, or natural waterways) could similarly be a constraint, whilst local geology might easily hamper the cutting of new ditches. The need to secure higher ground could be a double-edged sword, something exemplified by Bristol's Brandon Hill. A fort was constructed here by the Parliamentarian defenders in 1643 which was subsequently improved by the Royalists, transforming it into a place of strength.

16 David Papillon, *A practicall abstract of the Arts of Fortification and Assailing, etc*, (London: 1645) p. 56

17 Nicholas Stone, *Enchiridion of Fortification*, (London: Richard Royston, 1645), p. 34; David Flintham, *Kings Lynn Under Siege Archaeological Investigation Report, July 2022 - July 2024: North East Bastion, King's Lynn*, (King's Lynn Under Siege, 2025)

Fig. 3. Wenceslaus Hollar's plan of King's Lynn (Pennington catalogue P987), c.1660, illustrates the town's defences as they would have looked following re-fortification in 1643-4 (the new fortifications were designed by Richard Clampe, a local mathematician), and not at the time of the siege as some histories suggest. Note how the post-siege fortifications encompass open land to the north of the town, presumably to offer protected grazing land for livestock. Thomas Fisher Rare Book Library, University of Toronto

But to maintain this strength required a significant number of troops, so, when the New Model Army besieged Bristol in August 1645, they simply kept the troops on Brandon Hill occupied, thus denying their availability elsewhere[18].

New forts were constructed to occupy key strategic positions, perhaps to dominate a topographical feature or protect a river crossing, whilst bridges themselves may have had spans replaced by drawbridges. These outworks were commonly the multi-bastioned artillery-forts, especially the (largely) square four-bastioned type known as the 'sconce', which, whilst synonymous with the Civil Wars, were Dutch (or perhaps German) in origin. There was no standard

18 Richard Israel, *The Archaeology of the Fortifications constructed in England during the English Civil War (1642-1651): Bristol, Gloucester and Worcester* (thesis), (Bristol: University of Bristol, 2019 - http://research-information.bristol.ac.uk), pp. 276-82; Sprigge, *Anglia Rediviva. England's Recovery*, pp. 104-5

size for the sconce, and here, as in most things, the Civil War military engineer reacted to conditions and available resources. As a result, their size varied considerably: for instance, of five sconces built by the defenders of Newark, Sandhill's Sconce was the smallest (0.25ha), whilst the Queen's Sconce, at 1.40ha, was the largest[19].

In exceptional circumstances, as was the case in both London and Oxford, where the labour of the citizens helped construct the defences, urban growth had spread beyond the existing walls and required an entirely new fortified circuit to be constructed. Fortifications were not only constructed to protect the town itself, as some were constructed to screen open fields to enable the pasturing of cattle (as happened in Gloucester and York). A failure to protect a town's livestock could have far-reaching consequences, and the loss of heavy draught animals following the siege of Faringdon Castle in late April 1645 was a blow to the Royalists and meant that their artillery train for the siege of Leicester was reduced to just 14 pieces, the siege-gun component being two whole culverin (18pdr), and two demi-cannon (30pdr)[20]. Conversely, there were occasions when new defences were constructed behind the existing fortifications, either as a last line of defence or, as Cromwell discovered to his cost at Clonmel in 1650, a *coupure*, reinforcing a recent breach.

The Siege

The need to take enemy garrisons was a key component of the strategies of the opposing armies: the Scottish invasion of 1640 targeted the capture of Newcastle; whilst the capture of Bristol and Gloucester were the principal objectives of the Royalist campaign in the west in 1643; the Battle of Marston Moor was the culmination of the siege and relief of York in 1644, whilst later the same year, the Parliamentarian campaign in the south-west centred upon the relief of Plymouth. Ports and coastal towns were particularly important and the Royalists were prevented from capturing Hull, Lyme Regis, and Plymouth because

19 David Flintham, *The Town Well Fortified*, (Warwick: Helion and Company Limited, 2023), pp. 153, 226-27; See also Royal Commission on Historic Monuments, *Newark on Trent – The Civil War Siegeworks*, (London: Her Majesty's Stationery Office, 1964)

20 Ian Roy (editor), *The Royalist Ordnance Papers*, Part 1, (Oxford: Oxfordshire Record Society, 1964) p. 146, pp. 427-9

of Parliament's ability to reinforce and supply by sea[21], although Parliament's naval dominance could be challenged by Royalist ships operating out of Bristol and elsewhere. Garrisoned towns could influence strategies: for instance, during the summer of 1643, the only significant Parliamentarian presence in the whole of Yorkshire was Hull, but this was sufficient to prevent the Royalist Northern army leaving the region to threaten the lands of the Eastern Association, or even London, thus this 'localisation' a reluctance of troops to leave their home territory whilst there was any sort of threat against it, affected both sides. The fighting that took place across Ireland and Scotland was different in nature, and fortress warfare here was more likely to be centred on a castle or strongpoint, rather than a town, and during the Second (1648-9) and Third (1649-53) Civil Wars, this pattern became the norm for England and Wales too. Of course, as with any generalisation, there are exceptions aplenty.

There were various ways in which an attacker might conduct a siege: in his *Observations upon Military and Political Affairs*, George Monck considered that

> "there are seven ways to win Castles, strong Holds, and fortified Towns. First, by Treachery. Secondly, by Surprise, as by Petarring the Ports, and by Assaults. Thirdly, by Approaches, Batteries, and Assaults. Fourthly, by Approaches, Mining, Batteries, and Assaults. Fifthly, by Intrenching, Approaches, Mining, Battery, and Assaults. Sixthly by Composition. Seventhly, by Starving."[22]

This can be simplified even further by grouping sieges under four broad headings. First, there was the *coup de main*, where surprise was used to take an objective, such as Alexander Leslie's capture of Edinburgh Castle in 1639[23]. Then there was the 'smash and grab' where an assault was launched after a preliminary bombardment. This was a preferred tactic of the New Model Army under Cromwell, with just the threat of the assault was often enough to per-

21 Peter Young and Wilfrid Emberton, *Sieges of the Great Civil War,* (London: Bell and Hyman Limited, 1978), pp. 44-51, 52-57, 66-72

22 George Monck, *Observations upon Military and Political Affairs*, (London: A.C. for Henry Mortlocke, at the White-Hart in Westminster-Hall, and James Collins, at the Kings Head there, 1671), p. 118

23 Ronald Hutton and Wylie Reeves, 'Sieges and Fortifications', John Kenyon and Jane Ohlmeyer (editors), *The Civil Wars: A Military History of England, Scotland, and Ireland, 1638-1660*, (Oxford: Oxford University Press, 1998), p. 223

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Fig. 4. The 'Sconce', a four-bastion fort is the type commonly associated with the Civil Wars, although its origins are probably Dutch. This is a plan of the *Engelse Schans* (English Sconce) which was constructed by English mercenaries during the 1627 siege of Grol (Groenlo) in the Netherlands. There was a similarly named fort built by French forces. (Beleg van Groenlo 1627) (Wikipedia Commons).

suade the garrison to surrender (Fairfax, on the other hand, usually displayed a little more patience). Third, was the blockade, a longer-lasting affair where the besieger invested the fortress, constructing outworks and batteries, preventing communication and offensive activities by the garrison. This was the preferred option by an attacker unwilling (or unable) to attempt an assault and was used (albeit without much success) by the Royalists at Plymouth and Lyme Regis. Last, and least common was where a circumvallation of rampart and ditch, fort and battery would be constructed around the entire town, in so doing cutting it off from the outside world. This tactic was reliant on the besieger achieving local tactical superiority, and it is probably this one fact more than any other that decided the outcome of sieges. Unsurprisingly, examples of this are few: Newark (1645-6), Oxford (1646) and Colchester (1648). The siegeworks at Newark were planned by Richard Clampe who had previously designed King's Lynn's new fortifications in 1643-4, whilst both the sieges of Oxford and Colchester were attended by Colonel Thomas Rainborowe, arguably the New Model Army's most effective siege-master.

The logistical challenges of mounting any type of siege were considerable, not least the movement of the necessary artillery. Siege guns were incredibly heavy: the *demi-cannon*, the siege gun *par excellence* which could fire a ball in the region of 30lb, weighed 6,000lbs. The Civil War siege train was ponderous and slow moving: a dozen horses or 35 men were required to move a *demi-cul-*

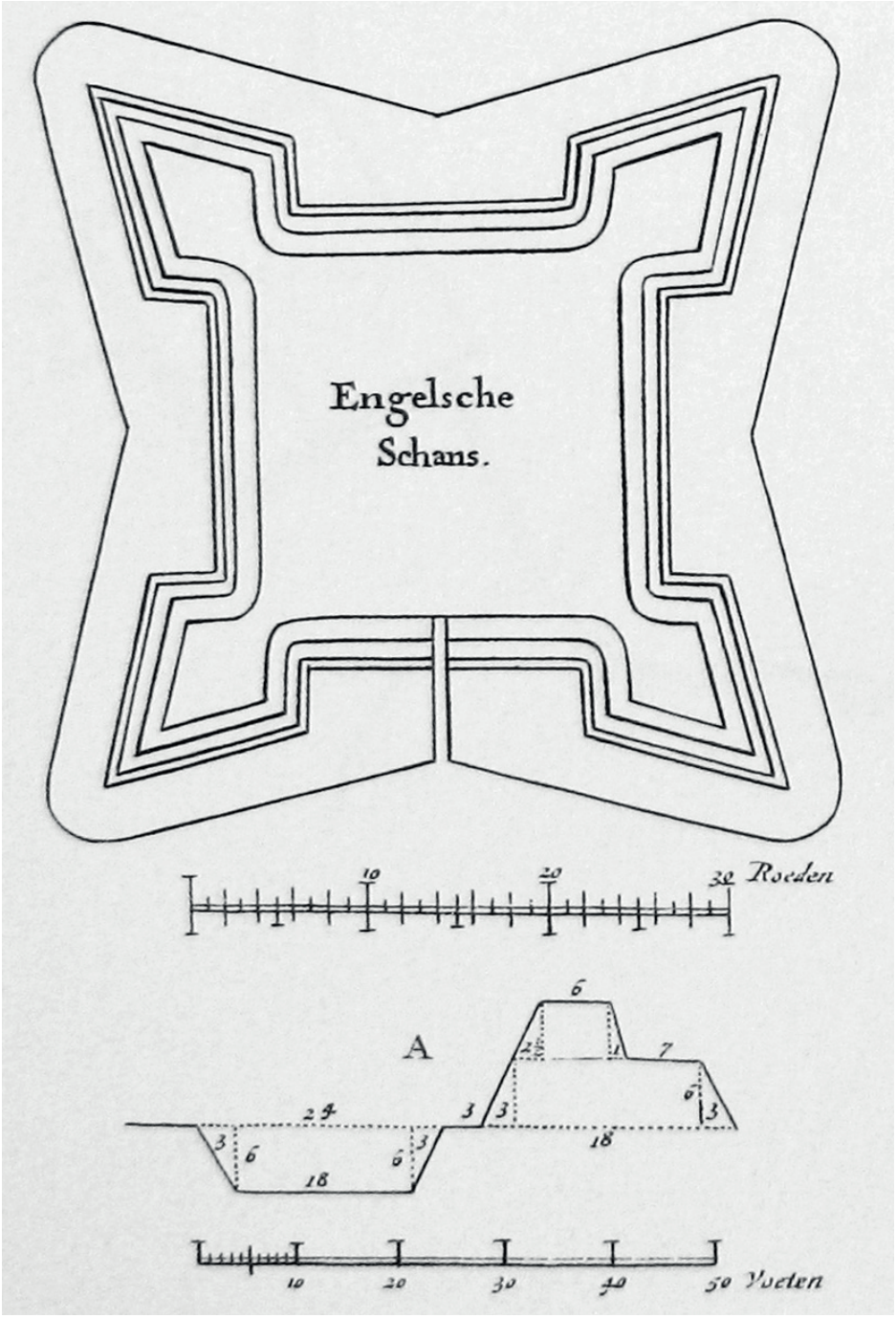
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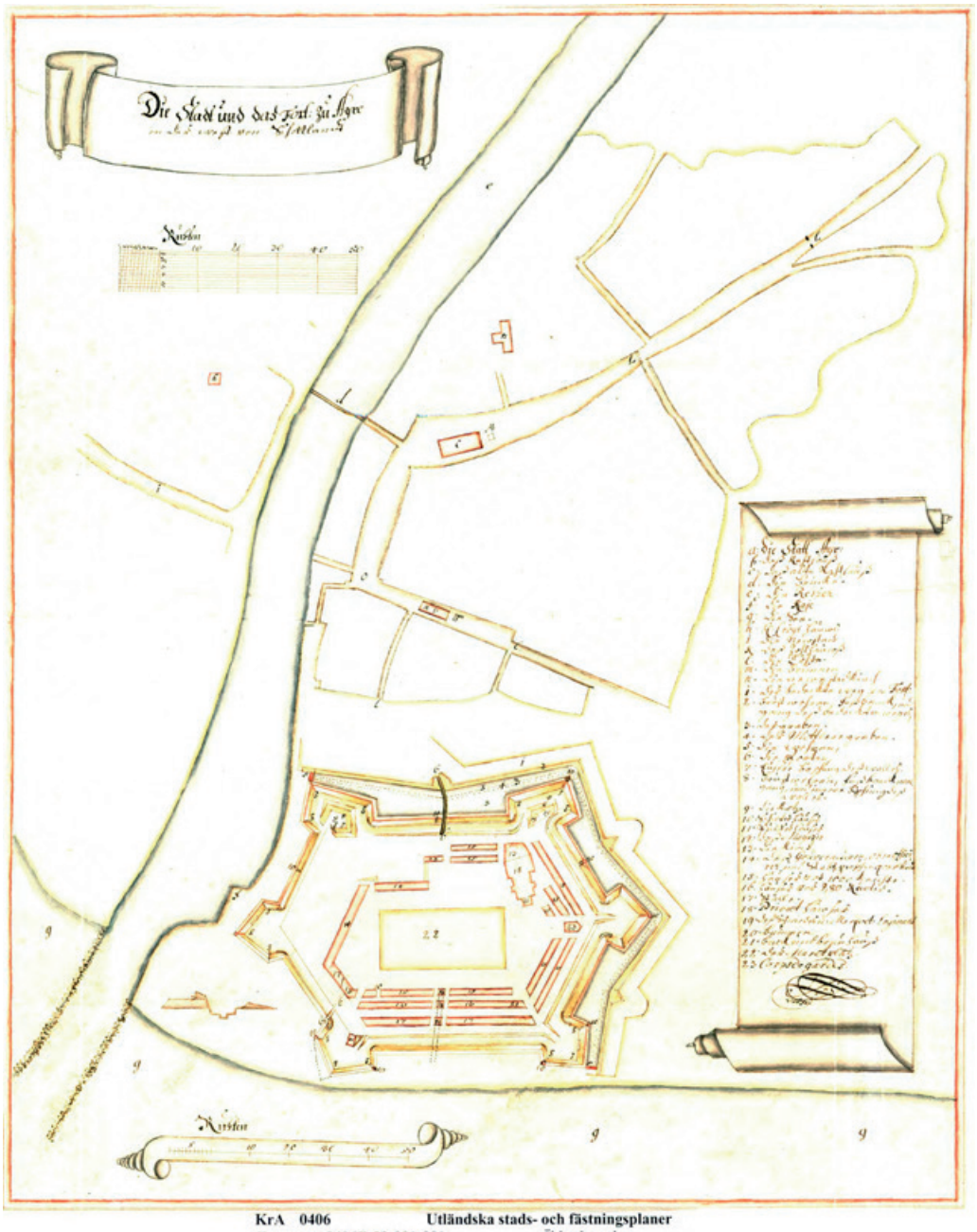
Fig. 5. *The City and the Fort in Ayre in Sud ... of Scotland*, c.1652 showing Ayr Citadel. Designed by the Swedish military engineer, Hans Ewald Tessin, Ayr was one of four citadels built in Scotland in the 1650s (the others were at Inverness, Leith and Perth). In addition, three smaller forts were also constructed, along with the garrisoning of several existing castles. Swedish National Archives (Riksarkivet) - Krigsarkivet/Utländska stads- och Fästningsplaner

verin, whilst between 30 and 40 draught animals (horses or oxen), or 100 men were needed to move a *demi-cannon*. There were the gunners, pioneers and miners, perhaps 250 or more, and then hundreds of co-opted infantry. Given the state of 17th century roads, it is of no surprise that there was a preference to move guns by water: the train that accompanied Cromwell to Ireland in 1649-50 included 11 siege guns plus 12 smaller field pieces[24], and was reliant on being able to transport them by boat whenever possible.

Another weapon in the besieger's arsenal was the mortar which could fire grenadoes (primitive shells) over defences to destroy internal structures (they were used effectively against Sandal Castle (Yorkshire) in 1645 and Elizabeth Castle, Jersey in 1651[25]). Whilst of limited use in demolishing fortifications, mortars could be a true terror weapon, damaging the bodies and nerves of defenders, although they were about as easy to move as a *demi-cannon*. But to be used effectively, artillery had to be skilfully placed and operated. Given this, and the general shortage of adequate siege guns, the use of alternative weapons comes of no surprise, including the petard (an explosive charge for blowing in gates), incendiaries, and impregnated burning straw (an early form of chemical warfare) and even, as tried by the Royalists in front of Gloucester, medieval-style siege engines. Another technique was mining, and as the examples of King John's Castle (Limerick) and Wardour Castle testify, this was the one area

24 Hutton and Reeves, 'Sieges and Fortifications', p. 205, pp. 209-10

25 Stephen Bull, *The Furie of the Ordnance, Artillery in the English Civil Wars*, (Woodbridge: The Boydell Press, 2008), pp. 106-8



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Storbritannien (Irland)
(Aijre) Ayr
Die Stadt und das Fort zu Ayre in Sud...von Schottland.

where Britain was ahead of contemporary practice[26]. Finally, cutting a garrison's water supply as happened at King's Lynn in 1643, and Pembroke Castle in 1648, was an age-old tactic, as were treachery, bribery and subterfuge[27].

Faced with these tactics, so much depended on the resolution of the defenders, and how the military governor provisioned his fortress and utilised the available resources, something that Monck set out in his *Observations*[28]. Women led the defence of several castles: the Parliamentarian Lady Brilliana Harley defended Brampton Bryan Castle in Herefordshire, whilst Corfe Castle in Dorset was held on behalf of the King by Lady Mary Banks and her daughters, and Lady Helen Neale, another Royalist held Hawarden Castle in 1645.

But perhaps the most famous defence was that of Lathom House in Lancashire in 1644 by the Royalist Countess of Derby (who subsequently held the Isle of Man until 1651)[29]. The first siege of Lathom House ended with its relief by friendly forces, a typical outcome for many sieges during the first years of the Civil Wars (the most famous example being Gloucester in 1643). Temporary relief might be brought about not by a full army but by the 'daring do' of a flying column, breaking through enemy lines to bring much needed supplies (this was something of a Royalist 'speciality' as examples at Banbury, Basing House, and Pontefract Castle testify). But so often, with no prospect of relief, the garrison surrendered, frequently allowed the full honours of war. Some places surrendered after a short bombardment, whilst even the more resolute defenders knew that they could not withstand a siege indefinitely without external intervention. Alternatively, a town might fall following the defeat of its defenders or of a relief force outside the town walls, whilst mounting casualties, increasing destruction, diminishing supplies, disease, starvation or no prospect of relief, could all lead to the surrender of a fortress.

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26 Kenneth Wiggins, *Siege Mines and Underground Warfare*, (Princes Risborough: Shire Publications, 2003), pp. 30-9

27 George Monck felt that betrayal "in Civil Wars Souldiers are apt to do, or when they are ill paid", Monck, *Observations upon Military and Political Affairs*, p. 132; Peter Harrington, *English Civil War Fortifications, 1642-51*, (Oxford: Osprey Publishing, 2003), p. 52; Hutton and Reeves, 'Sieges and Fortifications', p. 227

28 Monck, *Observations upon Military and Political Affairs*, pp. 130-41

29 John Barratt, *Sieges of the English Civil Wars*, (Barnsley: Pen and Sword Military, 2009), pp. 78-95

Fig. 6. Stefano della Bella's Soldaten die kanonnen afvuren depicts artillery in action against a fortified town during the 30 Years War, a scene that would be all too familiar across Britain during the Civil Wars. Soldaten die kanonnen afvuren, Stefano della Bella, 1620 - 1664 (RP-P-OB-34.523) Rijksmuseum, Amsterdam

But the failure to surrender in a timely manner right result in an assault where the full horrors of war would be unleashed: Birmingham in 1643 (where Prince Rupert, refused to abandon what he saw as the accepted European tactic of the *Brandeschatzung* or 'fire raid'[30]), Leicester and Basing House in 1645, and Drogheda and Wexford in 1649. Thus, the governor could be placed in a difficult position: unless relieved, he needed to defend his fortress for a sufficient length of time to avoid the wrath of his own side (there are several instances of a governor being court-martialled for surrendering a fortress prematurely) but at the same time not too long to provoke the storm.

30 Anon, *Prince Rupert's Burning love for England*, (London, 1643), p. 25

It was a form of warfare that impacted enormously on the civilian population: they constructed the defences, and during the siege itself might have assisted with the defence by loading muskets, boiling water to pour over any storming party, tending the wounded, or even volunteering as 'townsmen in arms'. But they also might be unwilling participants in a siege that they did not want nor could escape from, such as was the case in Colchester in 1648. They also suffered the consequences – in Plymouth, for example, during the three years which the town was under siege, 3,000 of the inhabitants died of disease, whilst in Bristol, twenty percent of the population died of typhus during 1643-4. But even adding these numbers to losses resulting from a storming (for example, when Bolton was sacked the Royalists were accused of massacring as many as 1,600 of the garrison of 2,500[31]), they are mercifully modest compared with contemporary continental sieges: there is nothing to compare with the siege of La Rochelle (1627-28) where the population decreased from 27,000 to 5,000, and the estimated 3,000 massacred at Drogheda is small compared to the 25,000 who perished at Magdeburg in 1631.

The great European military engineers of the 17th and 18th centuries were equally adept at constructing fortifications as they were besieging them. Not so during the Civil Wars where the military engineer was usually a separate role to the 'siege-master': the engineers might be architects, mathematicians or civil engineers, whilst those commanding sieges were principally soldiers, sometimes gunners. This might go some of the way to explain why Civil War sieges were often conducted in a less than scientific manner. Indeed, by the European standards of the day, the manner in which sieges were conducted across the country during the Civil Wars has been described as "incompetent", particularly in the lack of skill in which artillery was used. The gratifying noise and spectacle of the generalised bombardment was addictive to Parliamentarians and Royalists alike, despite the fact that seldom did the cannonade play a significant part in the decision of a fortress to surrender[32].

Contemporary thinking was that in order to take a strong, well-defended for-

31 John Barratt, *Cavaliers: The Royalist Army at War, 1642-1646*, (Stroud: Sutton Publishing Limited, 2004), p. 237

32 Christopher Duffy, *Siege Warfare: The Fortress in the Early Modern World, 1494-1660*, (London: Routledge and Kegan Paul, 1979), p. 159

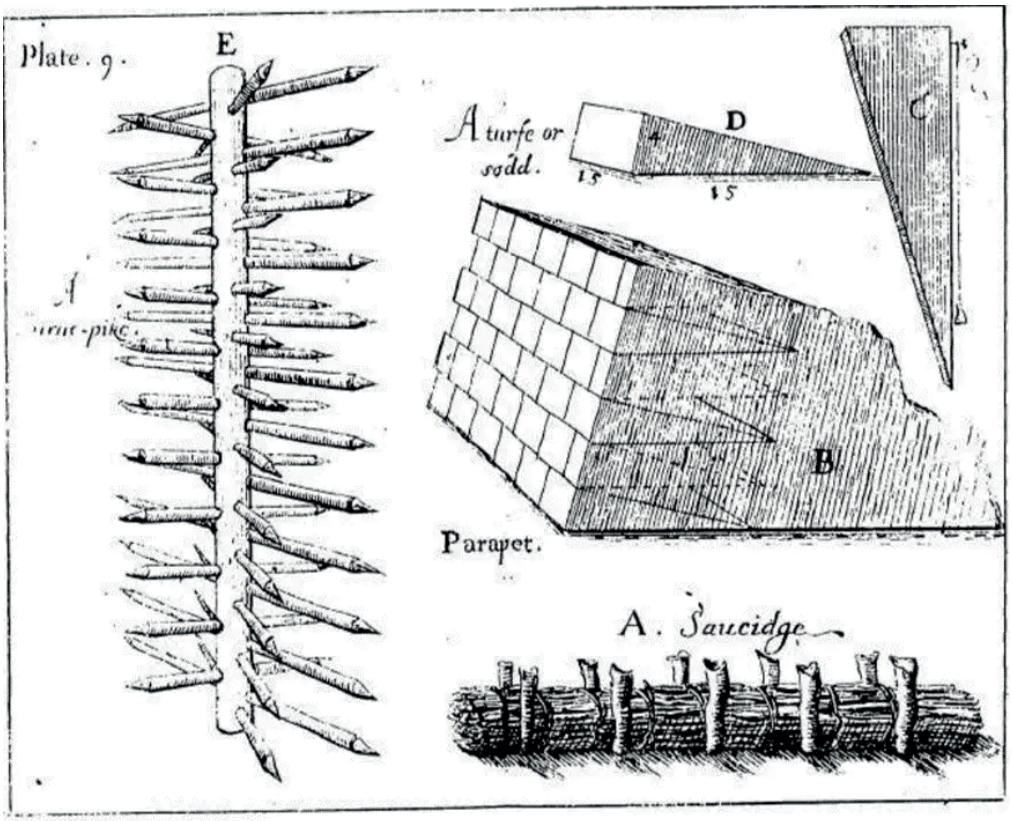

Fig. 7. Enchiridion of Fortification (Plate 9). The subject of fortifications was covered in numerous manuals written before and during the wars, including *Enchiridion of Fortification, Or A Handfull of Knowledge in Martiall Affaires* (1645) by Nicholas Stone. Plate 9 illustrates how turfs were to be cut, and then used to face ramparts. Also shown is the 'saucidge' which was used during rampart the construction. Author's Collection

tress, the besieger would need to outnumber the garrison by a ratio of 7:1. This was nearly achieved at the siege of York where the besiegers mustered 30,600 against 4,800 defenders[33], a ratio of 6:1, yet York fell only once the possibility of relief had been eliminated. Regardless of the effectiveness (or otherwise) of

33 Martin Van Creveld, *Supplying War: Logistics from Wallenstein to Patton*, (Cambridge: Cambridge University Press, 1980), p. 41; Peter Wenham, *The Great and Close Siege of York,* (London: Roundwood, 1970), p. xi

artillery, or the number of troops that a besieger might be able to muster, the critical factor in a successful siege was the besieger's ability to achieve and maintain local tactical superiority for the duration of the siege, thus ensuring that the siege could be progressed without the risk of external interference. This is why Newark fell in 1646 (but not in 1643 or 1644), and why the Royalists were ultimately unsuccessful in front of both Gloucester and Hull in 1643. The Royalists had first to defeat Sir William Waller's Parliamentarian army before it could besiege Bristol, and it is only after the victories at Naseby and Langport that the New Model Army could term its attention to the reduction of Royalist fortresses in the southwest, including Bristol.

Conclusions

The Civil Wars were "a war of trenches, ramparts, palisades, bombardments and blockades"[34], and the prevalence of sieges over field actions continued after the execution of Charles I in January 1649. As this essay has already identified, during his time in Ireland, Cromwell did not fight a single pitched battle, and following his departure in 1650, the on-going campaign was concentrated on mopping up the remaining Royalist strongholds. Cromwell is rightly remembered for two final battlefield victories, Dunbar in September 1650 and Worcester exactly twelve months later. Yet both of these involved a degree of fortress warfare. Dunbar was fought largely because the English army had been out-manoeuvred and had failed in its attempt to capture Edinburgh, a prize that would have to wait several months after the destruction of the Scottish army on the battlefield. Even then, Edinburgh Castle still held out and was finally yielded through treachery. Even after Dunbar and the subsequent victory at Inverkeithing, there were still countless strongholds to be captured, a task Cromwell left to General George Monck. The Battle of Worcester on 3 September 1651 entailed fighting in and around the city's fortifications, whilst the Parliamentarians also employed military engineering skills to construct bridge of boats across the rivers Severn and Teme.

34 Christopher Duffy, 'Siege Warfare', John Tucker and Lewis S. Winstock (editors), *The English Civil War: A Military Handbook*, (London: Arms and Armour Press, 1972), p. 65

The operations in both Ireland and Scotland to take the final Royalist strongholds took time, and small garrisons were often able to hold out against vastly superior English armies for months: Dunnottar Castle near Aberdeen held out until May 1652, whilst Clough Oughter Castle, County Cavan, did not surrender until April 1653.

The Civil Wars were brought to an end, not on the field of battle, but on the ramparts and in the trenches of fortresses and sieges, But this is not quite the end of the story. Whilst the way in which sieges were conducted did become less amateurish, and by the end of the wars, Britain was indeed embracing current military engineering doctrine, the aftermath of the Civil Wars resulted in a significant reduction in the number of places of strength, as existing fortifications were slighted or even completely levelled so they could no longer be turned into Royalist strongholds. However, at least two forts (Greycoat Place in London and Earith in Cambridgeshire) enjoyed a new lease of life as prison camps, the former housing Royalist and Scottish prisoners, the latter Scottish then Dutch prisoners.

Whilst the policy of de-militarisation was successful in England and Wales, in Ireland and Scotland is was soon realised that keeping the peace would require a constant military presence. To this end, a number of modern citadels and forts were constructed at key strategic locations, seven in Scotland, and five in Ireland. Then, the outbreak of war with the Dutch led to renewed fortress improvement and construction, most notably on the Isles of Scilly, guarding the approaches to the English Channel from the Atlantic. Thus, until the Restoration at least, Britain had caught up with her European neighbours.

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A map of the 1648 siege of Colchester published in a contemporary broadsheet entitled "A diary of the siege of Colchester by the forces under the command of Generall Fairfax" (Wikimedia Commons)

Two Sieges of Portuguese Melaka: 1629 and 1640-1641

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Abstract: The city-port of Melaka, on the western coast of the Malay Peninsula, was a Portuguese position from 1511 to 1641. For most of this period, it was also the only fortified Portuguese position of importance east of Sri Lanka. As such, it withstood a considerable number of sieges by neighboring Southeast Asian potentates, such as the Malay sultanate of Johor and the Sumatran sultanate of Aceh. The last and arguably the greatest siege took place in 1629, led by the Sultanate of Aceh. The successful Portuguese resistance against this large-scale operation was seen as a great feat of arms. Twelve years later, however, the Dutch East India Company took Melaka from the Portuguese after another protracted siege, succeeding where Aceh, the greatest maritime power in the region, had failed. This divergent outcome has traditionally been seen as evidence of European military "advance" over non-Europeans and, additionally, of Dutch "advance" over a surpassed Southern European power. Based on Portuguese and Dutch sources, this chapter assesses whether this traditional Eurocentric view holds up by comparing the two sieges in detail.

Keywords: History of Portuguese Overseas Expansion; History of Dutch Overseas Expansion; Military History; Siege Warfare.

In 1641, Justus Schouten, *Kommissaris* of the Dutch East India Company or VOC (*Verenigde Oost-Indische Compagnie*), visited Melaka, which the Company had recently taken from the Portuguese. He commented that the fortress had only developed into a stone and plaster, "geometrical" (*me-*

1 This article was undertaken as a part of André Murteira's research project, "Ships and War: Dutch and Iberian War Fleets in the Dutch-Iberian Global Conflict (1600-1669)", funded by FCT, Portugal (2021.02332.CEECIND). It also had the support of CHAM (NOVA FCSH), through the strategic project sponsored by FCT (UIDB/04666/2020) — https://doi.org/10.54499/UIDB/04666/2020".

etkunstig) construction after the arrival of the Duch in Asia, more specifically after its first unsuccessful siege by the VOC in 1606.[2] Although its redesign had not been fully completed, he praised it for its strength, stating that it made it unconquerable by Asian princes. Only Europeans armed with great power and luck could hope to take it.

At first glance, history seems to confirm this assertion. The city-port of Melaka, on the western coast of the Malay Peninsula, was a Portuguese position from 1511 to 1641. For most of this period, it was also the only fortified Portuguese position of importance, east of Sri Lanka. As such, it withstood a considerable number of sieges by neighbouring Southeast Asian potentates, such as the Malay sultanate of Johor and, most of all, the Sumatran sultanate of Aceh. The last and arguably the greatest siege took place in 1629, led once more by Aceh. The successful Portuguese resistance against this large-scale operation was seen as a great feat. Twelve years later, however, the VOC took Melaka from the Portuguese after another protracted siege, succeeding where Aceh, the greatest maritime power in the region, had failed. Following Schouten's views, this divergent outcome has traditionally been seen as evidence of European military "advance" over non-Europeans and, additionally, of Dutch "advance" over a surpassed Southern European power. Based on Portuguese and Dutch sources, this chapter assesses whether this traditional Eurocentric view holds by comparing the two sieges in detail. It argues that the comparison is anything but conclusive in poliorcetic matters and that the reasons for the Dutch victory of 1641 should be sought in VOC naval supremacy, rather than in any clear superiority in siege warfare proper.

The Estado da Índia*, the sultanate of Aceh and the VOC*

A few brief words about the three contenders are in order before proceeding to the description of the two sieges. At the height of its power in the sixteenth century, the *Estado da Índia* - the name then given to the Portuguese empire

2 P. A. Leupe, ed., *Stukken betrekkelijk het beleg en de verovering van Malakka op de Portugezen in 1640-1641* (Utrecht, 1859), 160-61 (there is an English translation: P. A. Leupe and Mac Hacobian, eds., "The Siege and Capture of Malacca from the Portuguese in 1640-1641", *Journal of the Malayan Branch of the Royal Asiatic Society* 14, no. 1 (124) (January 1936): 1–178).

in Asia - consisted mostly of a network of fortified coastal enclaves spread out from East Africa to the Malay-Indonesian archipelago.[3] Militarily, the standard view is that the Portuguese countered their numerical inferiority at sea by using superior full-rigged ships heavily armed with artillery, and on land by building coastal fortresses that could be supplied by sea and defended from the multitudes outside by the same artillery that made Portuguese ships superior.[4] While the *Estado* included a handful of fortified positions on the East Africa coast, the Persian Gulf, the Strait of Melaka, and the Moluccas, most of its military power was concentrated on the West India coast and Ceylon, or present-day Sri Lanka. The military resources of these far-out establishments were not comparable to those available at the core of the *Estado* in West India; therefore, they often depended on the military help provided by the latter region. Melaka was a typical case in this regard.

The port of Aceh, in North Sumatra, was an international emporium for Indonesian spices, primarily pepper, which was abundant on the island. Furthermore, it coupled this commercial status with the role of the Estado's primary historical adversary in the region. In 1523, as a young and rising power, Aceh halted the incipient Portuguese expansion in Sumatra by expelling them from their short-lived fortification in Pasai (1521–1523), the first and last fortified outpost they held on the island.[5] Over the subsequent decades, it became the chief antagonist of Melaka, besieging the city on multiple occasions. Concurrently, it functioned

3 Sanjay Subrahmanyam, *The Portuguese Empire in Asia, 1500-1700: A Political and Economic History* (London: Longman, 1993); Malyn Newitt, *A History of Portuguese Overseas Expansion, 1400-1668* (London: Routledge, 2005); Anthony Disney, *A History of Portugal and the Portuguese Empire: From Beginnings to 1807, Vol. 2, The Portuguese Empire* (Cambridge: Cambridge University Press, 2009).

4 Vítor Luís Gaspar Rodrigues, "A guerra na Índia", in *Nova história militar de Portugal*, vol. 2, ed. António Manuel Hespanha (Lisboa: Circulo de Leitores, 2004), 198–223.

5 On the relations between the Portuguese and Aceh and also Johor, see M. A. P. Meilink-Roelofsz, *Asian Trade and European Influence in the Indonesian Archipelago between 1500 and about 1630* (The Hague: Martinus Nijhoff, 1962); Manuel Lobato, *Política e comércio dos portugueses na Insulíndia: Malaca e as Molucas de 1575 a 1605* (Macau: Instituto Português do Oriente, 1999); Jorge Manuel dos Santos Alves, *O domínio do norte de Samatra: a história dos sultanatos de Samudera-Pacém e de Achém, e das suas relações com os Portugueses, 1500-1580* (Lisboa: Sociedade Histórica da Independência de Portugal, 1999); Peter Borschberg, *The Singapore and Melaka Straits: Violence, Security and Diplomacy in the 17th Century* (Leiden: KITLV Press, 2010); Paulo Jorge de Sousa Pinto, *The Portuguese and the Straits of Melaka, 1575-1619: Power, Trade and Diplomacy* (Singapore: NUS Press, 2012).

as a supply port for the Red Sea spice route, a major competitor to the Cape of Good Hope Route, while also maintaining a political and military alliance with the Ottoman Empire, which controlled the Arabian ports at the route's western terminus.

The famous Dutch East India Company, or VOC, was founded in 1602, when all Dutch companies that had recently begun trading with Asia were joined in a single great monopolistic and militarized organization.[6] In 1605, the new company carried out the first Dutch conquests of Portuguese positions by taking the fortresses of Ambon and Tidore in the Moluccas, in what is now Eastern Indonesia. At approximately the same time, it also laid an unsuccessful siege to Melaka (1606) and to Mozambique Island on the East Africa coast (twice, in 1607 and 1608). In 1613, it carried out a short-lived conquest of the Solor fortress near Timor. However, after that, it largely refrained from conquest attempts against the Portuguese for a quarter of a century (the exception was a 1622 unsuccessful attack against Macao, in China). Only in 1638 did it go again on the offensive against the *Estado da Índia*, taking advantage of the considerable weakening of the latter in the intervening period. As we shall see, the 1640-1641 siege of Melaka was part of this renewed, large-scale offensive.

The 1629 siege of Melaka by Aceh

The 1629 attack on Melaka was the last in a long series of attempts by Aceh against the city since at least 1537. The history of this series of attacks provides an idea of the evolution of the Melaka fortress itself. Contrary to Justus Schouten's assertion, the transition from a wooden fort to a stone and plaster building with bastions occurred before the first VOC siege in 1606. It can be dated back to at least 1568, the date of another great siege by Aceh.[7] It coincided with the adoption by the Acehnese of more potent artillery (under the influence of their Ottoman allies), although they were still learning to use it in siege warfare. This parallel evolution contradicts the view of the period before the arrival

6 Gerrit Knaap, *Genesis and Nemesis of the First Dutch Colonial Empire in Asia and South Africa, 1596–1811* (Leiden-Boston: Brill, 2023).

7 Pierre-Yves Manguin, "Of Fortresses and Galleys. The 1568 Acehnese Siege of Melaka, after a Contemporary Bird's-Eye View", *Modern Asian Studies* 22, no. 3 (January 1988): 607–28.

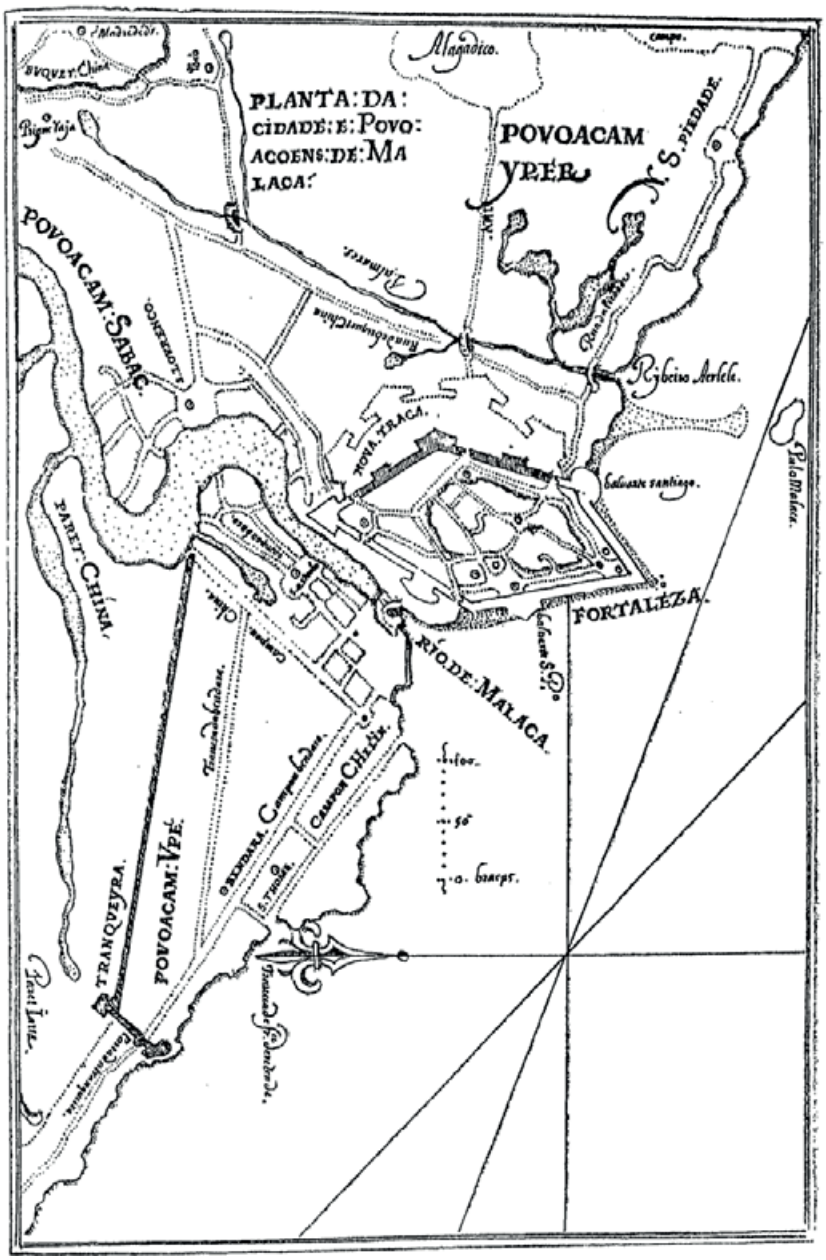

Fig. 1 Map of the city of Malacca and its sorrounding area by the Portuguese-Malay cartographer Manuel Godinho de Herédia (1563-1623), *Declaraçam de Malaca e da India Meridional com Cathay*, 1604. Wikimedia Commons.

of the Dutch as a static period in terms of military changes.

The 1629 Aceh expedition was an impressive force, much larger than the Dutch-led expedition that would capture the fortress twelve years later.[8] According to Portuguese sources, it was composed of 236 ships, 38 of which were great galleys, and it carried 19,400 men. A Dutch second-hand source reviews the number downward to 16,000 men, but that is still a high figure. In contrast, the Melaka garrison counted only 260 European soldiers and 450 Asian soldiers, besides 120 Portuguese citizens (*casados*) able to bear arms.[9]

The Acehnese arrived in Melaka in early July and landed south, proceeding to march towards the city, breaking through difficult terrain. Unlike the northern suburb of the fortress, the southern suburb was unfortified. However, the Portuguese attempted to check the enemy's advance by erecting provisional fortifications on the way. They delayed the attackers for a while but were eventually abandoned. The period between the landing of the Aceh troops and the eventual arrival of relief from Goa was characterized by the Acehnese's slow but steady advance. They made their way through digging trenches and building stockades (the fact that the Portuguese word "tranqueira" can mean both makes it sometimes harder to distinguish them in the sources). The proficiency and speed of the besiegers in these engineering tasks was the feature most praised by Portuguese sources. Praise included enthusiastic comparisons to the military engineering of classical times:

> "The strength of these bulwarks, and their construction [...] astonished all men well-versed and experienced in warfare. For it was found that neither the Greeks, the Romans, nor the modern men of today surpass

8 *Relafam da grande vitoria que os Portugueses alcansaram contra El Rey do Achem no cerco de Malaca...* (Lisboa, 1630); Joaquim Heliodoro da Cunha Rivara, "Victoria de Nuno Alvres Botelho em Malaca. 1629", *O Chronista de Tissuary*, no. 1 (January 1866): 3–20; Alfredo Botelho de Sousa, ed., *Nuno Álvares Botelho, capitão geral das armadas de alto bordo e governador da Índia* (Lisboa: Agência Geral das Colónias, 1940), 112–212, 241–54; Alberto Iria, ed., "Elementos de estudo acerca da possível contribuição portuguesa para a organização do Museu Histórico de Malaca", *Studia*, no. 6 (July 1960): 76; C. R. Boxer, "The Achinese Attack on Malacca in 1629, as Described in Contemporary Portuguese Sources", in *Malayan and Indonesian Studies: Essays Presented to Sir Richard Winstedt on His Eighty-Fifth Birthday*, ed. John Sturgus Bastin and R. Roolvink (Oxford: Clarendon Press, 1964), 105–21.

9 Sousa, *Nuno Álvares Botelho,* 246; P. A. Tiele and J. E. Heeres, eds., *Bouwstoffen voor de geschiedenis der Nederlanders in den maleischen Archipel*, vol. II ('s-Gravenhage: Martinus Nijhoff, 1890), 166.

> them in the ingenuity and design by which they were rendered impregnable; and our artillery fire was of very little effect. The swiftness with which they executed such an extraordinary work provoked even greater astonishment and wonder, for night would fall upon an open field, and by morning one would behold these miraculous bulwarks—making it seem as though nothing less than all the demons of Hell had come to their aid, furnishing them with the designs and blueprints."[10]

The Portuguese made much of the fact that none of their positions outside the fortress was taken, but that they chose to evacuate them, destroying them first. However, this did not change the fact that by the time the Goa relief arrived by the end of October, they had been driven inside the fortress, and the besieging force had already installed five main batteries from which it could bombard the fortress walls. Most important of all was the occupation of the Madre de Deus Monastery, at the top of a hill on the eastern side of the city. This was clearly the most dangerous point from the perspective of the besieged. Its occupation was crucial in the 1640-1641 siege, allowing the VOC artillery to open breaches in the eastern side of the walls through which Dutch troops would eventually storm the city.

We will never know whether Aceh's artillery would have achieved the same effect, since the arrival of relief brought the siege to a premature close after four months of operations. After the later rout of the attacking force, the Portuguese captured 130 cannons.[11] They were a mix of Portuguese, other European (most probably Dutch and English), and Aceh-produced pieces. If we add that some artillery was also thrown by the Acehnese to the bottom of the river, we appear to have a well-armed besieger force. However, concrete information about the calibres of these pieces is scant, apart from the fact that they variate between 6 and 73 (!) pounds.[12] Two exceptionally heavy cannons, shooting projectiles of

10 "A fortaleza destes baluartes, & a obra delles [...] meteo em espanto a todos os homens muy vistos, & experimentados na guerra porq se achou, q nem os Gregos, ou Romanos, ne oje os modernos lhe ganhão no modo do artificio, & traça cõ q ficauão inexpugnauês; & os nossos tiros de muy pouco effeito, pois apresteza cõ q elles fazião esta taõ rara obra, metia em mayor espãto, & admiração, porq anoítecia hu cãpo raso, & pella manhãa se vião estes encãtamentos: de baluartes, q não parece, senão q todos os demonios do Inferno os vinhão ajudar, & lhe dauão a traça, & modello." Sousa, *Nuno Álvares Botelho,* 146.

11 Sousa, *Nuno Álvares Botelho,* 174.

12 1 *Arrátel* (or Portuguese Pound) ≈ 459 grams.

55 and 73 pounds, are mentioned, but that is all there is. Nevertheless, at least 33 pieces were left in Melaka to strengthen the fort. It is safe to assume that at least some of them still integrated the fortress armament when it was taken by the VOC in 1641. As we shall see, the Dutch opined then that Melaka was well armed with heavy artillery.

As with the bombardment of the fortress, its encirclement was a task that was cut short before its completion. The besieging force had landed south of the city and, in its approach towards the fortress, had come to face roughly its southern and eastern sides. The western sides (two curtains) faced the sea, while the northern side was bordered by the Melaka River, which separated the fortress and the southern city from its northern side. The Aceh troops never crossed the river to the north, sparing the northern wall from bombardment and ensuring that the fortress could still be supplied by land from that side. However, after the siege ended, the Portuguese discovered that the besiegers had fabricated two large rafts to cross the river upstream. Therefore, it was only a matter of time before they attempted to completely encircle the city. As with the bombardment of the fortress walls, we will never know how they would have fared in that attempt (and it should be noted that the northern suburb of the city was fortified with an enclosure of timber and rammed earth, unlike the southern one).

Safe access to the northern side and supplies coming from that direction by land helped to preserve the besieged from scarcity. However, more important in that aspect was the fact that access to maritime supplies was also not cut (Melaka, after all, got most of the food that it consumed by sea, even in times of peace). When the expedition landed its forces, the Aceh commanders also chose to anchor most of their ships inside the river Duyong, south of the city. Since the waters at the river's entry were not deep enough, they had to disobstruct it to be able to enter it at high tide. This work was once more lauded by their Portuguese adversaries as an engineering feat (it is interesting to see the engineering qualities of the Acehnese so lauded by the Portuguese accounts of the siege; traditionally, Portuguese sources tended to praise them rather as fierce warriors, first and foremost).[13]

13 Sousa, *Nuno Álvares Botelho,* 142.

The absence of detailed sources on Aceh's side makes it difficult to understand the reasons for the choice to anchor most of the fleet in the river, which eventually proved to be fatal. A Portuguese account states that the commanders' intention was to free the crews for land operations.[14] This may point to the possibility that all the extensive engineering work carried out by the besiegers required ample reserves of labor. The Portuguese also reported that the Acehnese were confident that they would be able to take the fortress before the arrival of reliefs from Goa. They were encouraged when a small relief of five fleets sent from Nagapattinam (Southeast India) arrived by the end of September, thinking that no more reliefs were to be expected and that they could therefore remain in the river without fear. Finally, a Malay source pins the blame for the decision on the dual-command structure of the expedition, which would have rendered it dysfunctional.[15]

Be that as it may, the decision to anchor the fleet had two great disadvantages. First, it meant that the Aceh expedition failed to use the naval power at its disposal by ensuring a stricter blockade. Some ships remained at sea and managed to seize at least 17 Javanese and Malay ships destined for Melaka with food supplies.[16] However, this was not even enough to raise food prices in the city, much less create scarcity. When we compare this situation with the devastating famine brought about by the 1640-1641 siege, the differences could not be starker. Second, by stationing the fleet inside the river, the Aceh commanders exposed it to the risk of being blockaded at the river's entrance by another naval force, even if that force was of inferior strength. We shall see that this is exactly what happened in the end.

The two disadvantages to Aceh of stationing the fleet inside the river were compounded by an important factor: the support offered readily by the rival sultanate of Johor to Melaka. As soon as he learned of the impending assault, the sultan was quick to write to the Portuguese captain, promising that he would order his subjects to assist the besieged city with supplies; that he would send immediate military assistance in the form of both a land and a naval expedition;

14 Sousa, *Nuno Álvares Botelho,* 142.

15 Ingrid Saroda Mitrasing, "Negotiating a New Order in the Straits of Malacca (1500-1700)", *Kemanusian: The Asian Journal of Humanities* 21, no. 2 (2014): 72.

16 Sousa, *Nuno Álvares Botelho,* 147.

and that he would, finally, go in person to the help of the city at the head of a joint Johor-Pattani naval force.[17] He delivered on the three promises. First, the Johor merchant ships were crucial in keeping Melaka well-supplied. Second, the first fleet sent (60 ships, 1,500 troops) captured two Aceh galleys, after which the few ships left by the Acehnese patrolling the sea joined the rest of the fleet by the river. Third, the joint Johor-Pattani armada (160 ships, 9,000 troops), commanded by the sultan in person, arrived shortly after the Portuguese relief expedition from Goa and was ready to assist it in its attack against the suddenly cornered Aceh fleet. Finally, after the latter fleet's eventual destruction in the river and the flight of many of its men to the interior, the Johor land forces succeeded in capturing many of them, including one of the commanders of the expedition, who was delivered to the Portuguese.

The relief fleet from Goa was commanded by Nuno Álvares Botelho and was composed of 29 ships, 28 of which were galliots and one a "war pinnace" (*patacho de guerra*).[18] It carried approximately 769 soldiers. While it considerably strengthened the original garrison of Melaka, it was dwarfed as a fleet by the sheer size of the Aceh armada, especially in the light of the fact that it did not include galleons or galleys. However, the blockade of the Acehnese in the river annulled their considerable naval superiority. They lifted the siege and attempted to withdraw, but Botelho had already blockaded the river entrance. Using barges as platforms for heavy artillery, he was able to beat back the armada's attempt to fight its way out. After unfruitful negotiations, the Acehnese set fire to their ships and fled inland in disarray.

When reporting the events to Batavia, the VOC *opperkoopman* at Djambi, Sumatra, expressed confidence that if Aceh had benefited from Dutch naval support, it would have been able to take the fortress.[19] However, as the Portuguese themselves admitted, if the Acehnese had kept at least part of their great armada operating at sea, the same might have happened.[20] Thus, there was a great difference between what happened during the last recorded siege of Melaka in 1606. Then, a joint VOC-Johor siege of the fortress was broken up by the arrival from

17 Sousa, *Nuno Álvares Botelho,* 247-48

18 Rivara, "Victoria de Nuno Alvres Botelho", 7.

19 Tiele and Heeres, *Bouwstoffen*, II, 167.

20 Rivara, "Victoria de Nuno Alvres Botelho", 13.

Goa of a great armada of eighteen full-rigged ships (galleons and carracks).[21] This set of events followed a pattern established during the many sieges suffered by the city in the sixteenth century, when help from Goa could usually be counted upon in the most urgent cases, although it could take some time to arrive. Importantly, this help would most of the time include contingents of full-rigged ships, whether carracks or, more often, galleons, the capital ships of the period. As late as 1615, a force of four galleons, supported by some lighter vessels, was enough to inflict heavy damage on a great Aceh war fleet passing by Melaka, sinking around 50 ships.[22] Fifteen years later, however, all Goa could muster was a fleet of galliots (basically, a smaller version of galleys). This was a sign of a significant degradation of the naval capacity of the *Estado da Índia*, which increased its vulnerability to the new threat presented by the Dutch East India Company.

The 1640-1641 siege of Melaka by the VOC and Johor

The degradation of Portuguese naval power only increased during the 1630s, the decade in which the *Estado* began an irreversible process of decline and contraction.[23] Taking advantage of and at the same time contributing to a series of local contexts unfavorable to the *Estado*, the VOC began a series of conquests of Portuguese positions in 1638 on the eastern coast of Sri Lanka, or Ceylon. In the space of twenty-five years, it would take all the Portuguese positions in Ceylon, Malabar, or Kerala (Southwest India) and the vital ports of Nagapattinam ((Southeast India) and Melaka.

This was the context in which the siege and conquest of Melaka took place.[24]

21 André Murteira, "Portuguese Military Expeditions to Southeast Asia, 1597–1606", in *The First World Empire: Portugal, War and Military Revolution*, ed. Hélder Carvalhal, André Murteira, and Roger Lee de Jesus (London: Routledge, 2021), 144–46. On this siege, see Leo Akveld, ed., *Machtsstrijd om Malakka: De reis van VOC-admiraal Cornelis Cornelisz. Matelief naar Oost-Aziê, 1605-1608* (Zutphen: Walburg Pers, 2013); Peter Borschberg, ed., *Journal, Memorials and Letters of Cornelis Matelieff de Jonge: Security, Diplomacy and Commerce in 17th-Century Southeast Asia* (Singapore: NUS Press, 2015).

22 Pinto, *The Portuguese and the Straits of Melaka,* 323–24.

23 Subrahmanyam, *The Portuguese Empire in Asia*, 172–81.

24 Fernão de Queiroz, *Historia da vida do venerável irmão Pedro de Basto, coadjutor temporal da Companhia de Jesus, e da variedade de sucessos que Deus Ihe manifestou* (Lisboa, 1689),

Like in 1606, the VOC operated in alliance with Johor. However, it also attempted to have Aceh on its side, without success.[25] The first ships of the Dutch expedition arrived in Melaka at the beginning of June 1640. The first landing only took place around two months later, after the arrival of more ships and troops from Batavia, alongside an expeditionary force from Johor. A contingent of around 600 Company men (soldiers and sailors), accompanied by a similar Johor force, disembarked north of the city, outside the range of the artillery fortress.[26] No attempt was made to prevent the landing. The disembarked force also met with scarce resistance on their march towards the fortress. This was an important difference from what occurred in 1629. The first line of the Portuguese defences, the fortified northern quarter, was easily overrun, and the attackers laid siege to the fortress from the northern shore of the river.

According to the more extensive Portuguese source on the events, the scarce resistance offered to the besiegers was explained by a division within the Portuguese ranks.[27] While the second-in-command repeatedly advocated for offensive actions, the actual commander was obsessed during the whole siege with sparing the scant human resources at his disposal (260 soldiers and 200-300 armed civilians).[28] He placed his hopes on the eventual arrival of relief from Goa, attempting only in the meantime to hold out the longer possible. Thus, he refrained from attempting any major initiatives against the besiegers. This approach was already patent at the time of the Dutch landing, when he ordered the troops stationed outside the fortress to offer only token resistance against the

369–76; Baltasar de Santa Cruz, *Tomo segundo de la Historia de la Provincia del Santo Rosario de Filipinas, Japon, y China, del Sagrado Orden de Predicadores* (Zaragoza, 1693), 410–16; Leupe, *Stukken*; François Valentijn, "Valentyn's Description of Malacca", *Journal of the Straits Branch of the Royal Asiatic Society*, no. 22 (1884): 225–46; J. C. Overvoorde, "Eene niet gepubliceerde kaart van de belegering van Malaka in 1640-41', *Tijdschrift voor Indische Taal-, Land- en Volkenkunde* 66 (1926): 604–17; Panduronga S. S. Pissurlencar, ed., *Assentos do Conselho de Estado. Vol. II. 1634-1643*, (Bastorá, Goa: Tipografia Rangel, 1953), 305–11; Iria, ed., "Elementos de estudo" 87–89; C. R. Boxer, "Karl Marx and the Last Days of Portuguese Malacca, 1640-1641", *Indica: Journal of the Heras Institute of Indian History and Culture* 19, no. 2 (1982): 123–28.

25 Sher Banu A. L. Khan, "Ties That Unbind. The Abortive Aceh–VOC Alliance for the Conquest of Melaka, 1640–1641", *Indonesia and the Malay World* 38, no. 111 (July 2010): 303–21.

26 Leupe, *Stukken*, 28.

27 Queiroz, *História da vida*, 371.

28 Leupe, *Stukken*, 27.

attackers and retreat safely and in haste to the interior of the ramparts.

After the landing, there followed almost six months of siege, with many losses and suffering on both sides. The VOC set up camp on the northern shore of the river, where its first battery or batteries were stationed at "a musket's shot" from the fortress's walls.[29] The natural barrier presented by the river bordering the northern wall made any storming attempt from that side difficult. Eventually, the VOC troops crossed the river and set up another battery on a hill facing the northeastern side of the fortress (at the Madre de Deus Monastery, the location previously taken by the Acehnese for headquarters). This was the side through which the fortress was eventually stormed after months of heavy bombardment opened breaches in the walls. Most of this extensive damage appears to have been concentrated in the northeastern, northern, and northwestern regions. However, according to Dutch sources, the Portuguese counter-bombardment was equally violent, resulting in the destruction of many houses on the city's northern shore. After capturing the fortress, the Dutch found it armed with 68 heavy guns (and 50 light ones), a quantity they found excessive, and reduced to around 40.[30] Gunpowder was also equally abundant.

As mentioned at the beginning, Dutch sources praised both the strength and modern design of the fortress. We see now that they also attest to the number and potency of the artillery at its disposal. Therefore, the Portuguese problem does not seem to have been any lagging behind in the new technologies of artillery and artillery-adapted fortification. What failed them was the decimation of their human resources by inadequate supplies. Unlike the Acehnese, the Dutch managed to extend the siege to the opposite side of the river, completing the encirclement of the fortress. Although they recognized that they could not completely seal access to the southern side, supplies were scarce, leading to famine.

The situation was certainly much worse than it had been in 1629. Part of the reason for this was the switching of roles on the part of Johor. While in the previous siege it had been the main supplier of the city, it now acted as the blockade's main enforcer. The Dutch were the first to recognize that they were more effective in that role than the VOC ships, as their lighter vessels resembled those of the smugglers and could pursue them better. Johoreans were also praised as

29 Leupe, *Stukken*, 193.

30 Leupe, *Stukken*, 161, 193, 224.

builders.[31] They built the provisional bridges used by the Dutch to cross the river, as well as some of their fortified positions. This recalls the engineering proficiency of Aceh in 1629, which impressed the Portuguese.

The effects of the famine were compounded by a devastating epidemic that afflicted the city - a famously unhealthy place at the best of times. However, unlike famine, sickness also hit the besieging force especially hard. The VOC lost about half of the 3 000 men it had in service during the siege, most of them from sickness, not combat.[32] This included the first two commanders and other important officers. The numbers are more imprecise for the besieged. The fortress would have lost something like 7 000 persons, both by death and by flight or evacuation (late in the siege, civilians were ordered to leave due to lack of food).[33] However, a crucial difference was that the besiegers could count on regular resupply of men from Batavia, while the besieged could only hope for the help that never came from Goa.

The effects of sickness on both sides turned the siege into a prolonged endurance test. Repeated appeals to surrender were refused by the besieged. Sources inside the fortress told the Dutch that reports of the devastating sickness in the besiegers camp encouraged the Portuguese to hold on.[34] However, by the end, the lack of food became too serious to ignore. Civilians were expelled from the fortress, and a naval expedition was sent to break the blockade and obtain supplies.[35] This was done against the will of the commander, as it would further decrease the size of the already depleted garrison. Informed of this, the Dutch finally stormed the fortress with a contingent of 650 men.[36] The entry point was a breach opened by their artillery on the northeastern bastion. Apparently, only 60 men were able to oppose them, and after some hard fighting, the cornered Portuguese agreed to surrender on relatively favorable terms. Freedom was granted to all non-military personnel, and a ship was even supplied by the VOC to transport any Portuguese who chose to leave the city to Nagapattinam.

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31 Leupe, *Stukken*, 55, 73-74.
32 Leupe, *Stukken*, 194.
33 Leupe, *Stukken*, 96.
34 Valentijn, "Valentyn's Description," 228.
35 Queiroz, *História da vida*, 373.
36 Leupe, *Stukken*, 90.

Fig. 2. Manuel Godinho de Eredia, *Portuguese map of the region of Malacca, with Duyon river marked.* (1602) Wikimedia Commons

Conclusion

The balances of the siege by Dutch and Portuguese sources concur in the main. Although the fortress was strong and well-armed, it fell due to a lack of supplies, which opened the way to famine and sickness, weakening it decisively in terms of personnel numbers.[37] The classical way for Melaka to withstand sieges in the past had been to ensure a minimum of supplies through blockade evasion in the short term, while waiting for relief from Goa in the medium

37 Leupe, *Stukken*, 113-14; Santa Cruz, *Tomo segundo*, 412.

term. The 1629 siege was exemplary in both these aspects. The 1640-1641 one, on the other hand, saw the Portuguese fail at both points. Johor's role reversal seems to have been especially important in this regard. In 1629, it was the main supplier of besieged Melaka. In 1640-1641, by siding with the Dutch, not only did it cease to fulfil that role, but was also vital in suppressing the supply to the fortress, due to the efficiency of its small, light ships in the pursuit of smugglers who employed similar craft. One Dutch official claimed that Melaka would not have suffered such a famine if it had kept Johor by its side.[38]

However, another decisive factor was less conjunctural in nature. The lack of relief from Goa was a result of the superior naval power of the VOC, especially in terms of full-rigged ships. This had been growing as that of the *Estado da Índia* decreased. The ultimate reason for this naval resources imbalance lay with the superior capacity of the Dutch company to produce more full-rigged ships in Europe and transfer them to Asia with fewer losses than the Portuguese.[39] The *Estado* ceased to send carracks and galleons east of Ceylon in the 1610s, either as merchant ships or warships. It kept whatever full-rigged ships it still had in the Western Indian Ocean, and from 1636 on, annual blockades by VOC fleets kept these locked in the Goa harbor (and a surprise Dutch attack in 1639 destroyed a good part of them).[40] While private trade proved that it could still function with convoys of light ships on certain routes, such as the Goa-Japan voyage, the absence of galleons rendered war fleets sent to the region more vulnerable, as the 1629 relief had already demonstrated. Even if a relief fleet had managed to reach Melaka on time, it is doubtful that it could have done much against the combination of Johorese light vessels and Dutch full-rigged and midsize ships.[41]

38 Leupe, *Stukken*, 236-37.

39 André Murteira, "The Military Revolution and European Wars Outside of Europe: The Portuguese-Dutch War in Asia in the First Quarter of the Seventeenth Century", *The Journal of Military History*, no. 84 (April 2020): 527–31.

40 C. R. Boxer, "The Surprisal of Goa's Bar", *The Mariner's Mirror* 16, no. 1 (1930): 6–17; R. J. Barendse, "Blockade: Goa and Its Surroundings, 1638-1654", in *Rivalry and Conflict: European Traders and Asian Trading Networks in the 16th and 17th Centuries*, ed. Ernst van Veen and Leonard Blussé (Leiden: CNWS Publications, 2005), 232–66.

41 Goa did manage to send a late relief fleet that received the news of the taking of Melaka when it stopped over at Cochin, in Southwest India. Pissurlencar, *Assentos do Conselho de Estado*, 308-11.

Portuguese Melaka does not seem to have fallen because of any important problems with its fortress and armament, but mostly because it could not count on the naval relief system that had ensured its survival for almost a century and a half. The same could be said about similar later sieges of Portuguese positions in Asia taken by the VOC, among all the great sieges of Colombo, in Ceylon (1656), and Cochin in Southwest India (1663). This clearly points to a pattern of structural Portuguese naval weakness in Asia during the period - a fatal vulnerability, since all important Portuguese fortifications were coastal. It can be concluded that the lack of naval support was more important to the outcome of the 1640-1641 siege than anything having to do with siege warfare proper (fortification design, siege tactics, etc.). Thus, the episode illustrates fortifications' dependence on relief and resupply, as mentioned in the introduction to this volume.

H. Linschoten
Naves celoces seu biremes, quibus Bello et transportandis mercibus utuntur Lusitani, et eorum hostes Malabares.
'Fuslen welcke die Portugeesen en haer vianden die Malabaren gebruycken ter oorloch, en om coopmanschap te voeren.
40 en 47

Baptista von Doetecum. Fusta with Portuguese pavilion in a hand-colored engraving from Jan Huygen Linschoten's Itinerario. The caption says in Dutch: *Fusta, which was used by the Portuguese and their enemies, the Malabares, for trading and warfare,* and in Latin *Swift-sailing ships or biremes, which the Portuguese and their enemies, the Malabars, use for war and for transporting goods*.ca. 1596. Koninklijke Bibliotheek Nederland. Wikimedia Commons.

Key to Success: Ottoman Siege Warfare in the Second Half of the 17th Century

by Kahraman Şakul

Introduction

The Period of Köprülü grand viziers (1656-1683) coincided with the time of significant change in European siege warfare. Known as methodic siege, the new siege techniques signaled the beginning of a transformation of siege-craft from art to science. Application of engineering skills and geometric calculations to trenchwork and troop deployment sought to increase predictability of the duration and success of the siege. The Ottomans' contribution to the new siege warfare and the benefits they gained from it can be seen when examining the great Ottoman sieges of the Köprülü Era.

The first technical aspect that stood out in the sieges of the Köprülü Era was the implementation of a three-stage approach associated with the so-called methodic siege. Every siege would start by digging several parallels and raising gun batteries. The zigzags towards the ditch and fortifications would follow, which allowed moving troops and guns closer to the target. Crossing the moat and mining would be a vital part of all sieges, whereas the last phase would not always be characterized by a final assault since the garrisons would surrender in many cases when the walls were breached. Undoubtedly, these phases could also be observed in previous sieges in different forms. What was new though was the standardization of these phases, independent of the characteristics of the castle and the topographical conditions. This is clear when examining the sieges of Érsek Ujvár [Nové Zámky, Slovakia; Gr., Neuhäusel; Tr., Uyvar] (1663), Candia (1667-699), Kamianets-Podilskyi [Pol., Kamieniec Podolski; Tr., Kamaniçe] (1672), Chyhyryn [Tr., Çehrin] (1678) and Vienna (1683). [1]

1 I have addressed this theme elsewhere: "Köprülüler Devri Kuşatma Teknikleri", ["Siege Tac-

This study asserts that the difference between Ottoman and European siege warfare was not great enough to justify a binary approach. There was no dichotomy, but rather a shared military culture throughout the ages. This can be illustrated best in siege warfare, because most Ottoman conquests between 1400 and 1800 were achieved through siegecraft. According to Bayly, early modern era was the age of proto-globalization. It was shaped by "diverse expansionist forces" (convergence) rather than European expansionism (divergence) in which military technology spread faster even than bullion. The rise of maritime European empires was counterbalanced by the overland expansion of Eurasian empires. A strong trend of state-building was evident in Asia and Africa in tandem with the movement of weapons, capital, commodities, ideas and people (men of war, religion, and trade). Globalization may be geographically limited and an uneven process. As Conrad suggests, "slices of time will be a more appropriate temporal unit for studying many topics than an allegedly inexorable march of globalization." Thus, geostrategic view provides us with ample opportunities to reframe the question of military acculturation (creolization) as a global pattern at a given period. Thus, I will follow the convergence model instead of the mechanistic divergence model (innovations radiating out in waves from the source) to underline the similarities and differences in one of the defining moments in the history of Eastern Europe.[2]

The Shape of Ottoman Military History

Global military developments, revolutions in military affairs (RMA), cultural contexts and the ensuing relative advantages over the foes are new trends in military history.[3] Pedro Navarro, a Spanish engineer in Venetian service, studied

tics in the Köprülü Era"] *Intricate Pathways in the Quest for Knowledge – Bilgi Arayışının Karmaşık Yolları – Festschrift for Feza Günergun Armağanı*, 2 vols. (Istanbul: Libra, 2025), 315-63; Kahraman Şakul, "Ottoman Siege Warfare in the Second Half of the Seventeenth Century", in Hacer Kılıçaslan, Ömer Faruk Can, and Burhan Çağlar eds., *Living in the Ottoman Lands: Identities, Administration, and Warfare*. İstanbul: Kronik and OSARK, 2021, 289–302.

2 C. A. Bayly, "Archaic and Modern Globalization in the Eurasian and African Arena, c. 1750-1850" in *Globalization in World Hist*, A. G. Hopkins ed. (London: Random House, 2002), 47-74; Sebastian Conrad, *What is Global History* (Princeton University Press, 2017), 11, 99-100.

3 Wayne E. Lee, *Waging War: Conflict, Culture, and Innovation in World History* (Oxford

Ottoman siege mining methods to turn them against the Ottoman garrison that had seized the fortress of San Giorgio in the Venetian island of Cephalonia in the Ionian Islands in 1500. He did it by sapping and blowing up bastion defenses rather than breaching them with a massive bombardment. Navarro subsequently joined the Spanish forces fighting the French in the south of Italy, where his success with a huge mine he drove under walls of the Castello Nuovo outside Naples in 1503 forced other military engineers greatly to elaborate ditch defenses around artillery forts. İskender Muda, Sultan of Acheh, conquered much of Sumatra and established footholds in Malaysia. In east Sumatra in 1612 he wrested control of the sultanate of Deli from the Portuguese through a systematic application of parallels and zigzags. The Ottoman engineers also fortified Surat, the strategically vital window of Hindustan on the Indian Ocean in Gujarat, against the Portuguese.[4]

Students of Ottoman military history emphasizes the emergence of a shared military culture in the Mediterranean and Hungarian fronts over the centuries. If such a common military culture indeed existed, its strongest traces should be sought in siege warfare. For most Ottoman conquests between 1400 and 1800 were achieved through siege warfare. Yet our knowledge of Ottoman sieges remains limited because of the small number of studies devoted to the subject. The Köprülü Era, which coincided with a period of transformation in European siege warfare, based on geometrical deployment of siege lines and engineering expertise. This approach came to be known as the "methodic siege." The Ottoman contribution to, and benefit from, this new siegecraft becomes apparent when one examines the major Ottoman sieges of the Köprülü Era.[5]

University Press, 2016), 215-254; *Global Military Transformations: Change and Continuity, 1450-1800*, ed. Jeremy Black (*Società Italiana di Storia Militare*, 2023); Mark Charles Fissel ed., *The Military Revolution and Revolutions in Military Affairs* (Berlin/Boston: De Gruyter Oldenbourg, 2023); Jeremy Black, "Rethinking Military Revolutions", *The Critic* (20 Jan. 2020), https://thecritic.co.uk/rethinking-military-revolutions.

4 Christer Jörgensen et al., *Fighting Techniques of the Early Modern World AD 1500 – AD 1763* (Staplehurst, 2005), 175-76; Salih Özbaran, "The Ottomans' Role in the Diffusion of Fire-arms and Military Technology in Asia and Africa in the Sixteenth Century", in Özbaran (ed.), *The Ottoman Response to European Expansion* (İstanbul: Isis, 1994), pp. 61-6; A.C.S. Peacock and Anabel Teh Gallop eds., *From Anatolia to Aceh, Ottomans: Turks and Southeast Asia* (Oxford University Press, 2015).

5 Jameel Ostwald, *Vauban Under Siege: Engineering Efficiency and Martial Vigor in the War*

The new type of fortress architecture that emerged alongside the spread of firearms, together with high-sided ocean-going sailing ships and infantry volley-fire tactics, constituted the three pillars upon which the military revolution thesis rests. Ottoman military historiography has already produced original responses concerning the latter two issues within the broader debates of world military history, allowing us to situate the Ottoman position in infantry tactics and naval architecture.[6] However, the same cannot be said for siege warfare. Military historians generally accept that sieges were often more decisive than pitched battles in determining political and military outcomes. Until the Treaty of Karlowitz (1699), siege warfare constituted the principal instrument of Ottoman territorial expansion. During the 157 years between the Battle of Mohács (1526) and the Second Siege of Vienna (1683), the Ottomans conquered the entirety of Hungary through sieges while fighting only three major pitched battles in the region: Mohács, Mezőkeresztes (1596), and Saint Gotthard (1664). Despite this reality, studies on Ottoman sieges remain few. Yet from the conquest of Constantinople onward, the Ottomans were recognized as one of the foremost siege powers of their age.[7]

Academic studies do exist for some Ottoman campaigns that culminated in siege warfare. Ottoman historians have generally followed the models proposed by Finkel in her study of the Long War (1593-1606) and by Murphey in his study of the second conquest of Baghdad (1638-39). These works, however, merely summarize the military-technical phases of sieges rather than analyze them in detail. In line with the "new military history," they emphasize campaign organization rather than combat itself. Such studies provide valuable information concerning the Ottoman war system: the planning of army marches (maintenance of roads, repair and construction of bridges), supply logistics (establishment

of the Spanish Succession (Leiden: Brill, 2007), 22-46.

6 Günhan Börekçi, "A Contribution to the Military Revolution Debate: The Janissaries Use of Volley Fire during the Long Ottoman-Habsburg War of 1593-1606 and the Problem of Origins", *Acta Orientalia* 59.4 (December 2006): 407-438; Özgür Kolçak, *Ok, Tüfek ve At: 16. Yüzyıl Osmanlı Askerî Devrimi* (Ankara: TTK, 2023) [Bow, Musket and Horse: the 16th-Century Ottoman Military Revolution].

7 Gabor Ágoston, "Habsburgs and Ottomans: Defense, Military Change and Shifts in Power", in *Ottomans, Hungarians, and Habsburgs in Central Europe: The Military Confines in the Era of Ottoman Conquest*, ed. Gézá Dávid and Pál Fodor (Leiden, 2000), 129-32.

of staging posts and a provisioning system), the production and distribution of munitions and equipment (weapons, armor, gunpowder, picks, shovels, tents, ropes, rain cloaks, etc.), and military finance (revenues and expenditures). Yet they fail to offer a detailed narrative of military operations. In fact, there exist Ottoman eyewitness accounts that narrate siege warfare in all its phases. Among these are *gazavatname*s (books of victories/conquests), campaign diaries (*ruznames*), and certain chronicles containing eyewitness testimony. Some of these sources have already been published in critical or non-critical editions. Such publications are primarily intended either to facilitate access to the sources or to analyze them from a literary perspective.[8]

Ottomans no doubt perfected their siege techniques in the Long War with the Habsburgs and the siege of Baghdad. The Ottomans used incendiary bombs as early as in the first siege of Rhodes (1480) to terrorize the defenders. They readily adopted the grapeshot and perfected parallels and zigzag with the addition of redoubts to parallels during the siege of Candia. At the siege of Eger (1596), the Ottomans undermined the inner fort in fourteen different places. At Győr (1594), they made cave-like holes in the brick walls and drilled the foundation of the wall from inside so as to fill up the cavities with gunpowder. The underground mine attack was a common feature of Ottoman sieges at least since the Long War and more effective than heavy cannonade in bringing the siege to a successful conclusion.[9]

Siegecraft was never the exclusive realm of the military experts. The resumption of Ottoman expansion based on siege warfare familiarized the literati of the day with the technicalities of the siegecraft. Literary works that glorified the victory referred to constitutive elements of the siege warfare on the supposition that the audience already knew the nuts and bolts of methodic war. The metaphor of "unconquerable maiden" abounded in the works that celebrated the

8 Caroline Finkel, *The Administration of Warfare: The Ottoman Military Campaigns in Hungary,1593-1606* (Viyana: Verband der Wissenschaftlichen Gesellschaften Österreichs, 1988); Rhoads Murphey, "The Functioning of the Ottoman Army Under Murad IV, 1623-1639/1032-1049" (Unpub. Ph.D diss., University of Chicago, 1979).

9 Ágoston, *Guns for the Sultan*, 48, 91, 193; Rhoads Murphey, *Ottoman Warfare, 1500-1700* (New Jersey: Rutgers University Press, 1999), 291; Tibor Szalontay, "The Art of War During the Ottoman-Habsburg Long War (1593-1606) According to Narrative Source" (Unpub. Ph.D. thesis, University of Toronto, 2004), 118, 124.

conquest of Kamianets-Podilskyi, which surrendered in ten days. The siege of Baghdad was the yardstick used to describe the size of the Ottoman army in any given campaign, while San Demetrio (Tr., *Ak Tabya* [white bastion]) of Candia was the perfect hornwork that set the bar in the architectural evaluation of any besieged fortress.[10]

It should be noted that fortifications and siegecraft became part of cross-cultural debates with mutual claims to superiority. Foreign observers of Ottoman military architecture in this era asserted that the Ottomans had captured most of their modern fortresses from their Christian rivals. Ottomans resented that Europeans despised Ottomans fortifications. Evliya Çelebi, the famous Ottoman traveler who purported to be an expert on siege warfare, claimed that the Europeans would have changed their mind if they had examined fortresses like Bender (Bendery), Segedin (Szeged), Özi (Ochakov), and Avlonya (Vlorës) -none of them were *trace italienne*!.

"Ottoman battlefield anthropology" is judgmental about the martial qualities of their foes. In terms of expertise in siege war, Germans and Venetians were the ablest foes, whereas Poles were vainglorious and foolishly courageous. The Ukrainians (*Rus*) did not inspire much respect at Kamianets-Podilskyi (cowards hiding behind the gabions) but impressed the Ottomans at Chyhyryn by their defiance of death at suicidal sorties and mêlées. The Cossack defenders were no less judgmental when they shouted from the fortification, "O Turks! Do you take the men of this fortress for the hatted Franks of Crete, who surrendered Candia of their own accord and departed like women before the destruction of the fortifications? Never would such a thing occur among us. So long as even one of us remains alive, and so long as a trace of our fortress still stands, we shall fight, and we shall not yield even a finger's breadth of land."[11]

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10 Kahraman Şakul, "Siege Warfare in Verse and Prose: Ottoman Conquest of Kamianets-Podilsky (Kamaniçe), 1672," *The World of the Siege: Representations of Early Modern Positional Warfare*, ed. Anke Fischer-Kattner and Jamel Ostwald (Leiden: Brill, 2019), 207. Medieval French concept of Marian Fortress (i.e., Mary) represented virginity as a fortress under siege, see Christiania Whitehead, "A Fortress and a Shield: The Representation of the Virgin in the *Château d'amour* of Robert Grosseteste", in *Writing Religious Women: Female Spiritual and Textual Practices in Late Medieval England*, ed. Denis Renevey and C. Whitehead (Toronto, 2000), 109-33.

11 Şakul, "Siege Warfare in Verse and Prose, 223-24; idem., *Çehrin Kuşatması*, 160.

An Ottoman Grand Strategy?

It is important to contextualize the Ottoman sieges of the era by discussing the question of imperial frontiers and the matter of Ottoman grand strategy. Obviously, war shaped the formation of imperial frontiers under the Köprülü administration. The Ottomans renewed the territorial expansion in an attempt to control the Ottoman northern arc, stretching from Slovakia across the Pontic Steppe as far as the lower Volga.[12] While the Ottoman conquests of Érsek-Úyvár (1663), Candia (1667-69), Kamianets-Podilskyi (1672) and of Chyhyryn (Çehrin) (1677-78) served this policy, it was inevitably doomed to failure after the unsuccessful siege of Vienna (1683). The expansion of the imperial frontiers relied on siege warfare and Ottoman perfection of new siege techniques.

It is questionable if the concept of "grand strategy" is of any use to understand the long-term political and military dynamics of early modern Ottomans. But territorial expansion may be coined the grand strategy of the Köprülü statesmen for an obvious reason. The members of Köprülü family monopolized the office of the grand vizier for a long time and this was an exceptional case in Ottoman history. One way of justifying their rule was religious and ideological propaganda. They were represented in Ottoman literary production as the champions of Islam who conquered the infidel territory in the Mediterranean as well as central and eastern Europe.[13]

The Köprülü grand viziers hoped to transform the buffer vassal states (Transylvania, Wallachia, Moldovia) into regular provinces ruled from Istanbul by surrounding them with the new provinces of Ineu (Yanova), Oradea (Varad), and Kamianets-Podilskyi. Mühürdar Hasan Agha, a confidant of Fazil Ahmed, happily announced that Transylvania ceased to be a frontier zone after the conquests of Érsekújvár, Levice (Léva), and Novigrad (1663). In the same vein, Behceti Hüseyin Efendi, who was in the entourage of Kara Mustafa Pasha, de-

12 İ. Metin Kunt, "17. Yüzyılda Osmanlı Kuzey Politikası Üzerine Bir Yorum," *Boğaziçi Üniversitesi Dergisi*, 4-5 (1976-1977), 111-16; Kahraman Şakul, "Der Expansionismus der Köprülü", in Michael Hochedlinger (Hrsg.), *Der große Türkenkrieg, 1683-1699* (Wien 2025), 102-108.

13 Gábor Ágoston, "Information, Ideology, and Limits of Imperial Policy: Ottoman Grand Strategy in the Context of Ottoman-Habsburg Rivalry", Virginia H. Aksan and Daniel Goffman ed., *The Early Modern Ottomans: Remapping the* Empire (New York: Cambridge University Press, 2007), 75-103; Şakul, "Der Expansionismus der Köprülü", 102-108.

clared that only after the conquest of Chyyryn (1678) did Kamianets truly become an Ottoman territory. These observations by the ruling elite demonstrate the common purpose the Köprülü wars served. The new northern policy was also evident in the decision to keep together in the archives the inventory that listed 320 forts in the vicinity of Kyiv, Chyhyryn, Cherkassy, and Human with the registers concerning the new province of Kamaniçe (Kamianets-Podilskyi).

Was the new northern policy the Ottoman grand strategy? Be that as it may, the vested interest of the Köprülü family still loomed large in shaping its intent and content. A chief concern of the Köprülüs in the new interventionism was the justification of their monopoly of power and consolidation of the clientele network they created. Until the disaster at Vienna, they followed a hawkish policy of creating diplomatic impasse as a pretext for war, acquiring prestige by conquest, and amassing wealth by establishing family endowments in the new territories. Due to their wealth and prestige, the Köprülüs occupied influential positions in the bureaucracy until the 1750s. As for the ideological aspect of the Köprülü aggression, Ottoman claims to be the refuge of the persecuted peoples in the Frankish world often go unnoticed. The Köprülüs justified their hawkish policies by presenting the sultan as the protector of the Orthodox (Cossacks and Greeks) and Protestant (Hungarians) peoples who did not share the same ethnoreligious identity as their kings and faced religious persecution at the hands of the Catholic powers (Vienna, Warsaw, and Venice). Transylvania was a much-needed shelter for Protestants in the Thirty Years War. The settlement reached at Karlowitz was the definitive response to Köprülüs' grand strategy of expansion and centralisation. It signified the end of the Köprülüs' monopoly on Ottoman politics and the Ottomans' exclusion as a decisive actor from the geostrategic entanglements in central and eastern Europe. Faced with severe challenges to its legitimacy, the Ottoman dynasty could not preclude the rise of regionalism based on life-term tax farms (introduced in 1695 as a wartime necessity) and was compelled to accept bargaining as a method of mobilisation of manpower and resources in the provinces.[14]

14 Feridun M. Emecen, "Osmanlılar ve Kuzey Karadeniz Stepleri" [Ottomans and the Northern Black Sea Steppes], idem., *Osmanlı Klasik Çağı'nda Siyaset* (İstanbul: Timaş, 2009), 250, 255 (fn. 39); Şakul, "Der Expansionismus der Köprülü", 102-108.

The First Phase: The Three-Parallel System

The first technical characteristic that stands out in Köprülü-era sieges was the adoption of a three-phase system associated with the new siege warfare. These phases consisted of digging the first, second, and third parallels (*metris*), advancing toward the fortress through zigzag trenches (*siçan yolu*: "rat paths"), moving artillery batteries forward, crossing the ditch, initiating mining operations, and finally carrying out the assault phase. Naturally, these phases can also be observed in earlier sieges in different forms. However, they became standardized stages independent of the fortress's particular characteristics or topography. This becomes evident when one examines the Siege of Érsek Ujvár, the final phase of the Siege of Candia, the Siege of Kamianets-Podilskyi, the Siege of Chyhyryn, and the Siege of Vienna.[15]

One essential task on the eve of a siege was reconnaissance of the fortress. Kara Mustafa Pasha personally led the reconnaissance force sent from the final staging camp before both Kamianets-Podilskyi and Chyhyryn. In both sieges, trench digging routinely began at night. This was necessary to avoid presenting easy targets to the defenders and to minimize casualties. At this point Ottoman practice seems to have differed from that of Europe. In Europe, trenches were usually constructed only after siege artillery had been emplaced, whereas the Ottomans immediately began trench construction. Moreover, compared to European practice, they dug their first line of trenches much closer to the fortress, within artillery range. Undertaking such dangerous work without artillery cover invited sorties from the garrison. Yet digging at night and the presence of large numbers of light cavalry and infantry probably reduced the danger of surprise attacks. After the first line of trenches had been completed, the zigzags moved forward toward the ditch, followed by a second line of trenches at a certain distance. The number of parallels sometimes reached 9 lines of trenches or even more as in the case of the sieges of Candia and Chyhyryn. Nevertheless, the first parallels were abandoned to sick and auxiliary services and the janissaries moved to the front trenches as the trenchwork progressed. This became standard practice in the Köprülü sieges.

15 For technical details of these sieges see Kahraman Şakul, *II. Viyana Kuşatması: Yedi Başlı Ejderin Fendi* (İstanbul: Timaş, 2021); idem., *Kamaniçe Kuşatması 1672* (İstanbul: Timaş, 2021); idem., *Uyvar Kuşatması 1663* (İstanbul: Timaş, 2021); idem., *Çehrin Kuşatması 1678* (İstanbul: Timaş, 2022).

One important feature of the three-parallel system was the use of elevated artillery platforms (*cavalier de tranchée*), which was a novelty in European siege warfare in the seventeenth century. These ramparts were crucial for enfilading the covered way and minimizing the casualties among the besiegers. They began to appear in Europe by the siege of Luxembourg (1684). Ottomans have been credited with introducing these techniques, whereas systematization of parallels and cavaliers has been acknowledged to be a Western success.[16] New research on siege warfare suggests that Vauban was "a systematizer of past techniques" of zigzag approaches, trench cavaliers, and parallels present in various forms in Europe. Ottomans also systematized the earlier practices and incorporated novelties in the siegecraft by learning from experience based on institutional memory, artisanal practice, and improvisation. During the siege of Candia, the Ottomans developed a method of protecting trenches at both ends with bastions. Earlier trenches dug parallel to the walls had been left open at the flanks and were therefore vulnerable to attacks from the sides. Under the new system, the Ottomans curved the ends of the trenches backward and erected elevated batteries within the resulting arc. In this way the curved end of the trench functioned as a defensive ditch for the battery, making flank assaults and sorties from the fortress far more difficult. The garrison was thus compelled to undertake frontal attacks on the trenches at considerable cost. The nature of Ottoman trenchwork has always been a subject of dispute. Polish sources described the Ottoman trenches in 1672 as wide enough to accommodate the Ottoman cavalry. This contradicts the Western accounts of the Ottoman trenchworks in the siege of Vienna (1683). Ottoman saps (zigzags) in 1683 tended to be sinuous, deep and long to give better protection to the soldiers than rectilinear European zigzags, which could not prevent grenades or cannonballs from traveling along their full length and inflicting heavy casualties.[17] At Candia, also, the diggers dug so deep to protect against countermining operations that they hit the water table. What accounts for this apparent discrepancy? Perhaps the sheer duration of the siege of Vienna accounted for a deviation from the normal Ottoman prac-

16 John A. Lynn, *Giant of the Grand Siècle: The French Army, 1610-1715* (Cambridge, 1997), 569-571.

17 Ostwald, *Vauban Under Siege*, 53, 58-61; Vernon J. Parry, "Hisar," *Encyclopedia of Islam* [2nd ed.], vol. 3 (Leiden, 1971), p. 479; Şakul, "Ottoman Siege Warfare", p. 295; Şakul, "Siege Warfare in Verse and Prose", pp. 218-19.

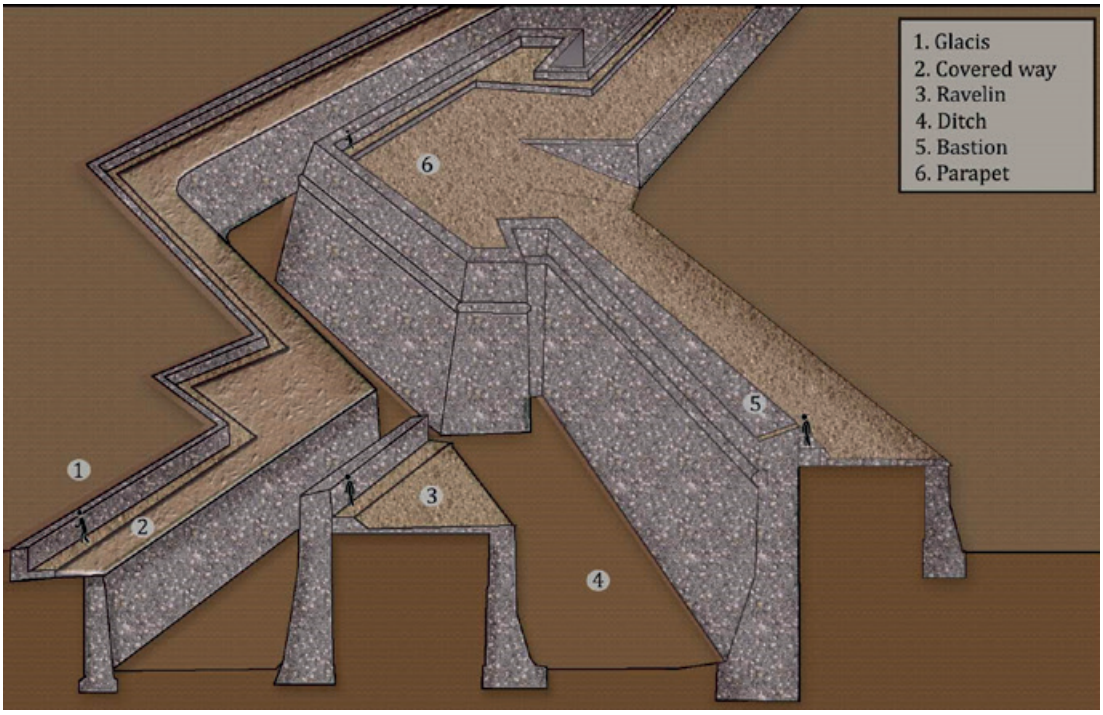

Fig.1 A cross section of a fortress wall and the ditch. Şakul, *II. Viyana Kuşatması*, 213 [The Second Siege of Vienna]. (reproduced as part of the TÜBİTAK ARDEB 1001 project no. 117K056)

tice of digging neat and orderly trenchwork. Obviously, it needs further research to conclude if there was any normal Ottoman trenchwork, given the differing landscape in every siege.

As in Vienna, these trenchworks could at times become so broad that newly arrived units could even parade in formation within them, and some contained fountains. After the Ottoman defeat at Vienna, European observers examining the trenches discovered that Janissaries had buried fallen comrades within trench walls. Many artillery pieces were dragged forward through the zigzag trenches, and, as at Kamianets-Podilskyi, mounted movement through these passages was possible. Their disadvantage, however, was the enormous amount of time required for their construction.

Ottoman accounts of siege wars focus on the deeds of the commanders rather

than the engineers. As the trenches approached the ditch, bunker-like command posts known as "pasha redoubts" were also constructed within them—a development first seen at Candia. These enabled pashas to command from the front line the so-called daredevils (*serdengeçti*: volunteer assault troops) and laborers digging the zigzag trenches. Compared to earlier sieges, the participation of high-ranking commanders in forward trench positions appears to have been a major innovation during the Köprülü era. Sources even depict the Köprülü grand viziers themselves distributing bows and arrows to assault troops from the foremost trenches. During their almost daily visits to the trenches, grand viziers would shoot arrows at the enemy positions as a symbolic act of holy warfare intended to inspire the troops. At Érsek Ujvár, Fazıl Ahmed Pasha visited flooded trenches during a stormy night and personally encouraged the laborers while standing knee-deep in water. Four years later, at Candia, he narrowly escaped death during one such inspection when a Venetian counter-mine killed several senior commanders and buried him in rubble. He also personally participated in hand-to-hand combat against French reinforcements arriving to assist the defenders. At Kamianets-Podilskyi, Kara Mustafa Pasha, commanding the left wing, rushed to aid cavalrymen struggling to drag artillery pieces into position during the early days of the siege, personally pulling on the ropes despite enemy fire to ensure the guns were emplaced before dawn. When his inferiors showed reluctance to storm a bastion, he volunteered to climb on the top of the parapets to embarrass his men. During the Siege of Chyhyryn, Ahmed Pasha, former treasurer and governor of Bosnia, was among the first to enter the fortress through a breach during the final assault.[18]

Another noteworthy practice emerged when terrain conditions were unsuitable for digging trenches and approach works as at Candia and Érsek Ujvár, where the ground was partly rocky. In such cases, soil was carried from afar and piled up toward the ditch to form trench systems artificially. Since the earth could be arranged from the outset in the form of trenches and zigzags, these artificially constructed trench networks became much wider and more comfortable. Evliya Çelebi describes the trenches at Candia as resembling an underground bazaar lined with shops on both sides. The Ottoman miners achieved tunnel

18 Şakul, "Siege Warfare in Verse and Prose", 221.

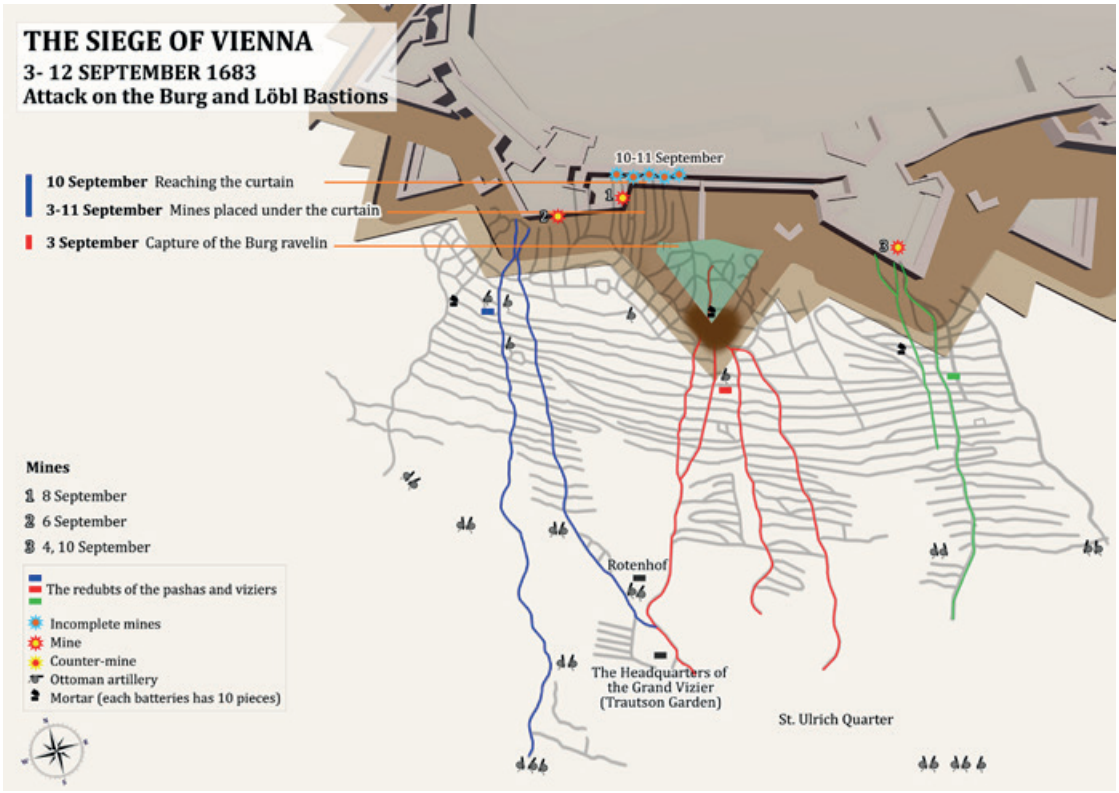

Fig.2 Plan of the Siege of Vienna on the day of the Battle of Kahlenberg (12 September 1683) Şakul, *II. Viyana Kuşatması*, 341 [The Second Siege of Vienna].(reproduced as part of the TÜBİTAK ARDEB 1001 project no. 117K056)

through huge plagues of rocks by new chiseling and drilling equipment learned from the experts who defected to the Ottoman camp.

Both the three-parallel system and elevated fire platforms have been attributed to the famous French military engineer Sébastien Le Prestre de Vauban (1633–1707), who first employed them at the Siege of Maastricht (1673). Yet in a private letter to a friend, Vauban admitted that he had been inspired by Ottoman practices observed during the Siege of Candia. On the other hand, rudimentary forms of zigzag trenches, elevated redoubts, and parallels were already known in Europe as well and Vauban may have equally been inspired by these European precedents. Therefore, there is no need to argue for a single source of diffusion for these innovations. In this respect, one important Ottoman

advantage was the long-established Corps of Miners (*Lağımcı Ocağı*). Through master-apprentice transmission, this corps likely developed a strong institutional memory over time. Indeed, the famous poet Yusuf Nabi, who participated in the Siege of Kamianets-Podilskyi, imagined the trenches as a school in which the art of war was learned. Vauban, perceiving the absence of such a corps as a weakness in France, recommended the creation of separate units of miners and laborers, but Louis XIV rejected the proposal because of the expense.[19]

Naturally, the Ottoman tactic of approaching the ditch through the three-parallel system led to the development of countermeasures. For example, Georg Rimpler, the engineer responsible during the Siege of Vienna for fortifying the ditch and counterscarp, had previously fought against the Ottomans at Candia. He therefore recommended adopting the Venetian concept of in-depth defense. At Candia, this had proven effective in blunting Ottoman assaults and keeping them away from the ditch until relief forces arrived. This tactic involved strengthening the counterscarp with thick stakes, digging defensive trenches, and launching frequent sorties to prevent Ottoman trenches from approaching the ditch. In such a war of attrition, the Ottomans were forced to accept heavy casualties for every bit of advance. Their solution was the use of shallow "blasting mines" (*püskürme lağımı*) designed to uproot the stakes and throw them into the ditch, though this required considerable time and gunpowder.

This strategy was successfully employed by Morosini at Candia, by Gordon, the Scottish commander of the New Bastion of Chyhyryn, and by Starhemberg at Vienna. Gordon, moreover, had personally observed fortresses designed by Vauban, the Dutch engineer Menno van Coehoorn (1641–1704), and the Saxon engineer Rimpler, who died during the Siege of Vienna in 1683. He had also studied major contemporary treatises on siege warfare. As a result, he pinned down the Ottoman advance until the Muscovite-Cossack relief army arrived at Chyhyryn. Lack of clear orders to attack the Ottoman army reduced the relief army to an observation force that watched the fall of the town from a distance.

19 Veysel Göger, "Taş Yasdanup Toprak Döşenenler: Kandiye Kuşatması Örneğinde Osmanlı Askerlerinin Metristeki Mücadele ve Yaşamı (1667-1669)", *The Journal of Ottoman Studies*, LII (2018): 41-78 ["The Men Who Took Stone and sSil for a Pillow and Comforter: Life and Struggle in the Trenches at the Siege of Candia"]; Lynn, *Giant of the Grand Siècle*, 569-70; Ostwald, *Vauban Under Siege*, 58-61, 166-68.

At Vienna, however, the relief army immediately forced the Ottomans into battle upon arrival and won a decisive victory. Candia, completely isolated, was eventually compelled to surrender, whereas the garrisons of Érsek Ujvár and Kamianets-Podilskyi were too weak to sustain such a strategy of attrition. Half the Érsek Ujvár garrison had been destroyed at the Battle of Párkány (Tr., Ciğerdelen) prior to the siege, while the Polish king, not expecting Kamianets-Podilskyi to be attacked, failed to reinforce the fortress.[20]

The Second Phase: Descending into the Ditch through Covered Galleries (Kubur)

The second phase, fought within the ditch itself, was the bloodiest part of every siege. Kara Mustafa Pasha is often accused of avoiding a direct assault on Vienna in order to preserve the city's wealth for himself, preferring instead to pressure the defenders through trenches and mines into surrender. Yet such judgments are unfair when viewed in light of contemporary siege techniques. During the Köprülü era, European military specialists increasingly divided into two camps: the proponents of the methodic siege ("the trenchers") vs. the advocates of all-out assault ("the stormers"). Engineers generally favored the former approach with a view to reducing casualties. Officers, by contrast, often preferred storming the fortifications to save time, even at the cost of severe losses.[21] In all Köprülü sieges, the topbrass had a firm belief in the wisdom of siege *à la sap*. Nevertheless, as seen during the Siege of Vienna, janissaries occasionally supported the latter view to no avail, preferring heavy casualties to the ordeal of endless trenchwork. According to the trenching approach, as the parallels neared the ditch, they were reinforced with calatrop shields (*domuz damı*: "pigpen"). These were sometimes two-storied prickly covered shelters from whose loopholes musketeers fired at the enemy while laborers continued digging new approach trenches under their protection. Undoubtedly the most arduous aspect of trench warfare was hauling artillery through the zigzag trenches and up onto earthen ramparts. In addition, large wicker baskets (gabions) filled with earth

20 Şakul, *Çehrin Kuşatması 1678*, 61-62, 159-60; idem., *II. Viyana Kuşatması*, 375-77; idem., *Uyvar Kuşatması 1663*, 46; idem., *Kamaniçe Kuşatması 1672*, 40.

21 Ostwald, *Vauban Under Siege*, 240-52.

had to be woven and placed in front of the batteries in order to conceal gun positions from the defenders.

Once the trenches reached 100–150 meters away from the ditch they were roofed over with planks and sandbags to protect against grenade fire. At the same time, artillery pieces had to be moved to increasingly advanced positions. Once the counterscarp and the firing positions defending the ditch had been captured, the best way to dominate them was by piling earth toward the counterscarp. This enabled the Ottomans to bring their earthworks to a level with the ditch and the defensive firing positions. As the siege progressed, these earthen ramparts rose even higher and overwhelmed the garrison fire. Mines were again used to help fill the ditch at designated points. A particularly effective tactic consisted of demolishing the counterscarp wall to fill the ditch with rubble. During this phase expert miners also selected suitable points for constructing covered tunnels called *kubur* (descent; pit), which descended to the floor of the ditch.

Because ditches were dug very deep, it was imperative to open a descent that connected the counterscarp to the floor of the dry ditch. Constructing these galleries without alerting the defenders was extremely difficult. Artillery batteries in other sectors would intensify their bombardment in order to distract attention from the descent sector. Once the descent was ready, the sappers crawled across the ditch, heaping up fascines and bags on the sides for protection. At this stage the defenders attempted to destroy the descent through cannon, grenade, and musket fire while also launching continuous sorties against it. Evliya Çelebi described the descent as a covered way cutting through the ditch all the way to the walls so that mines could be laid beneath the fortifications without exposure to enemy fire. The great traveler ascribed its name to its resemblance to a burial pit.[22]

The descent also served as a staging area where troops could gather safely before assaulting the ditch. Auxiliary forces prepared the timber, wool-filled sacks, bags, and wicker baskets required for the work. The Ottoman logistical system, advanced for its age, could estimate in advance the approximate number of sacks and bags needed for a siege. The prebendal horsemen (provincial

22 Murphey, *Ottoman Warfare,* 117-19; Kahraman Şakul, "Köprülüler Devri Kuşatma Teknikleri", 325.

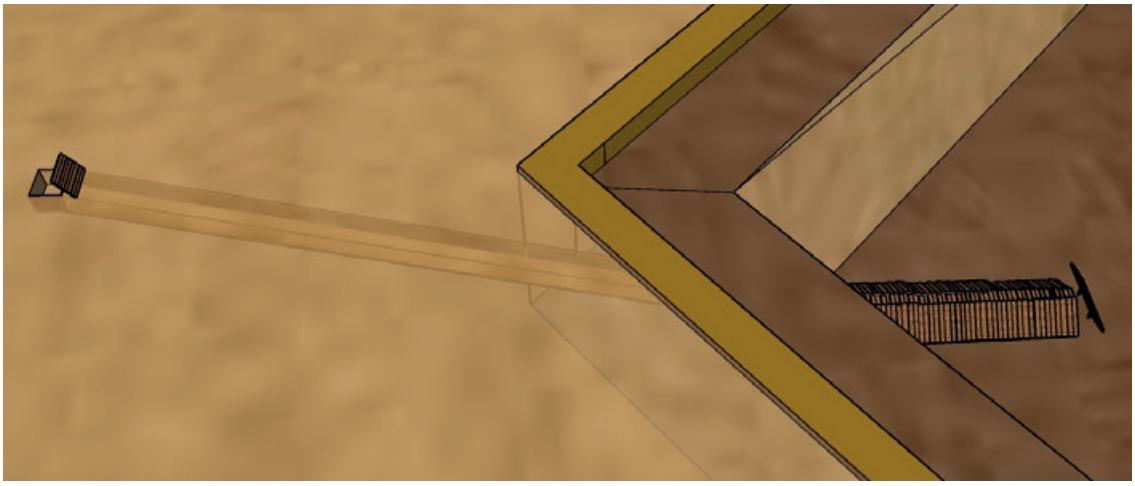

Fig. 3. Descent. Şakul, *Kamaniçe Kuşatması*, 64 [The Siege of Kamianets-Podilskyi]. (reproduced as part of the TÜBİTAK ARDEB 1001 project no. 117K056)

cavalry with timar [land tax] grants) were required to provide a certain number of sacks proportional to the size of their fiefs. Knowing that two sacks would be demanded for every thousand *akçe*s (asper) of revenue, they brought their due share of bags to the expedition. Members of the imperial cavalry and central bureaucracy were similarly obliged to provide sacks in proportion to their incomes.

Once the trenchwork reached the ditch, they were widened. If, as at Vienna and Candia, the defenders successfully detected and destroyed the descents, then—as happened at Vienna—the only remaining solution was to sap forward into the ditch rather than relying on small descents. At this stage it became necessary to expand the trenches and parallels near the counterscarp into large assembly areas capable of holding massed troops. In this way thousands of soldiers could assault the ditch at once.

As events at Candia demonstrated, the most effective way to stop the Ottomans in the ditch was to construct detached outworks (ravelin and tenailles) within the ditch itself to shield the curtain walls as well as caponiers ("chicken coop") and redans to bring the enemy in the ditch under crossfire. Countermine operations accompanied the fight for the ditch. Kamianets-Podilskyi and Chyhyryn lacked such outworks in and beyond their ditch and moats. The dry ditch

of the Kamianets-Podilskyi was situated on a steep ridge 100 metres above the riverbed (Smotrych River). The topography made it unnecessary to plant outworks around the town. The outworks of Érsek Ujvár were in the wet moat, but they had not yet been completed. At Candia and Vienna, however, elaborate outworks greatly slowed the Ottoman advance and exhausted the besiegers. Intense mining and countermining so churned up the soil within the ditch so much that it became impossible to dig further tunnels in both cases.[23]

The Third Phase: Reaching the Walls and Mining Operations

Once control of the ditch had been secured, the final phase aimed at reaching the walls before the arrival of a relief army. Naturally, depending on topography, supply conditions, the state of the garrison, seasonal factors, and news regarding relief forces, the final phase could overlap with the second. At Kamianets-Podilskyi, for example, the Ottomans employed a shaft-type mine. Following the old manner, they propped up planks against the walls to improvise a shelter for the miners who dug a vertical shaft. Once the foundation was reached, barrels of gunpowder were stacked and detonated. They followed a similar method at Érsek Ujvár. There, the Ottomans first diverted the course of the river that fed the moat and then dried certain sectors of the moat for building causeways. After one of the causeways reached the targeted bastion, they dug a shaft-type mine. On such occasions, defenders poured down from the embrasures boiling oil and water, grenades, naphtha, and other anti-personnel weapons. At Candia, Chyhyryn, and Vienna, by contrast, horizontal galleries were preferred. Although the Corps of Miners formed the professional core of such operations, the bulk of the labor during sieges was carried out by workers recruited from the mines and especially from among Armenian subjects of the sultan. Marsigli observed that Ottoman miners worked sitting cross-legged so that they dug narrower galleries with lower ceilings than their European counterparts who worked crouched on their knees. This in turn increased the destructive power of explosions.[24]

23 Şakul, "Siege Warfare in Verse and Prose", 226; idem., *Uyvar Kuşatması 1663*, 95-96; idem., *II. Viyana Kuşatması*, 80-85.

24 Şakul, "Siege Warfare in Verse and Prose", 229-30; Ágoston, *Guns for the Sultan*, 40-42.

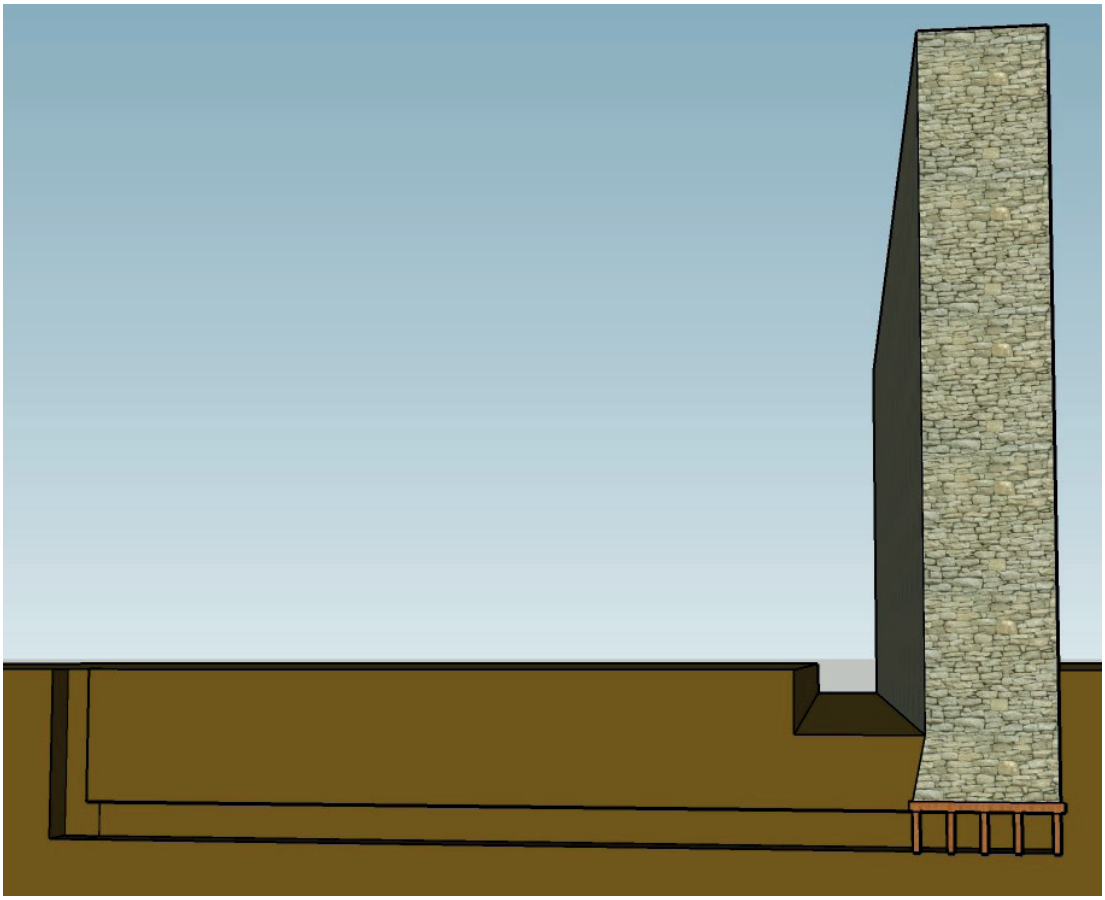

Fig 4. Mining and "burnt-prop" method (reproduced as part of the TÜBİTAK ARDEB 1001 project no. 117K056)

In addition to the shallow blasting mines, there also existed deeper galleries and even mines deep down the water table. The deeper the mine, the broader its dimensions. Some tunnels, begun from within the trenches at a distance from the ditch, became extremely long and deep. At Candia it is recorded that such tunnels, which could take up to a month to reach their target, were ventilated by hoses and bellows, following the Venetian example. Many years after the siege the three-story tunnels of Candia were still places of wonder. The miners passed the marshy terrain at Chyhyryn by constructing wooden underground gullies -another lesson from Candia. Once a gallery reached its destination, a chamber

("magazine") was excavated at its end and filled with barrels of gunpowder. The entrance to the chamber was then tightly sealed with logs and earth to prevent the blast from backfiring before the mine was finally detonated. The defenders, meanwhile, dug countermine galleries radiating outwards from the fortifications to locate Ottoman mines and destroy them. As Ottoman mines approached the walls, the besiegers intensified the artillery and grenade fire in order to suppress the noise of digging. During such bombardments the defenders often became convinced that Ottoman mines had already penetrated far beneath the fortress. They would try to detect the location of the mine by placing peas on a drum and observe the vibrations caused by underground digging. At times opposing miners met underground and fought hand-to-hand in the galleries. On occasion toxic sulfur gas and similar substances, suggestive of chemical warfare, were reportedly employed. There were ways to reduce the damage caused by mine explosion. At Chyhyryn, for example, defenders successfully dug a string of pits in the fortress running parallel to the wall and connected them through an underground gallery. When a mine exploded, the compressed blast gases escaped through these shafts instead of hitting the foundation of the fortifications. Similar measures were taken by the garrisons of Candia and Érsek Ujvár.[25]

Attacking fortresses through underground tunneling had been known since antiquity: the burnt-prop method. Before the gunpowder age, such tunnels were used either to infiltrate the fortress or to create breaches in the walls. The Roman historian Polybius mentions a third technique: excavating a large cavity beneath the wall foundation and supporting it with wooden props that were then burned. Once the props turned to ash, the unsupported wall inevitably collapsed. Ottoman sources describe this method as "burning the fortress foundation." Though archaic in appearance, it offered several advantages. While the medieval round towers were resistant to such underground attacks, the angular bastions that replaced them after the spread of artillery were not. These new bastions projected outward from the walls to eliminate blind spots, eventually giving rise to

25 Murphey, *Ottoman Warfare*, 105-32; Şakul, *Çehrin Kuşatması 1678*, 112; *The Diary of General Patrick Gordon of Auchleuchries 1635-1699*, v. 3: 1677-1678, ed. Dmitry Fedosov (Aberdeen: AHRC Centre for Irish and Scottish Studies, 2012), 72-73; diversionary heavy bombardment was a common method. For a similar example from the Ottoman siege of Eger (1596) see Szalontay, "Ottoman-Habsburg Long War", fn. 108, pp. 124-25.

modern star-shape fortresses such as Érsek Ujvár. Yet their projecting points, especially their salient angles, proved highly vulnerable to old-fashioned shaft mines. Historians unfamiliar with siege warfare have often portrayed the burnt-propped method employed at Érsek Ujvár as a brilliant innovation. Nevertheless, it only demonstrated that an artillery-proof fortress might be forced to surrender by an archaic tactic. The lesson is clear: technological development is not always a linear process producing superior results in every context. Innovations that appear advantageous on paper may reveal profound weaknesses under actual battlefield conditions. A similar phenomenon appeared at Chyhyryn. Among the fortresses discussed here, Chyhyryn alone was a palanka-type fortress. It boasted an earth-filled double stockade of three layers of logs. Throughout the siege, the Ottomans failed to destroy the new bastion (hornwork) of Chyhyryn because every explosion merely hurled the flexible wooden structure into the air as a whole before it settled back into place. It could withstand the siege almost 40 days mainly because the sandy soil caused considerable delay in the progress of mines. Any breaches created were immediately filled again by the earth packed behind the walls. Consequently, the Ottomans repeatedly resorted to another archaic method: attempting to burn down the enormous palisade with tar and olive oil.[26]

When Ottoman miners advancing within the ditch approached too closely to the vulnerable salients of the bastions, the defenders would hurl enormous 250-kilogram grenades from the walls down onto the ditch floor. The resulting craters disrupted Ottoman mining galleries and prevented further approach. Under such circumstances, as at the siege of Vienna, the Ottomans were forced to detonate their mines before they had reached their intended targets. Finally, another widespread defensive measure involved piling up earth behind the curtain walls in order to prevent breaches caused by mines. The earth absorbed the vibrations of artillery fire and fill the breach. In all Köprülü-era sieges the Ottomans struggled against such measures. At Candia, indeed, even entering

26 Sidney Toy, *Castle: Their Contruction and History. With 199 Illustrations* (New York: Dover Publications, 1984 [reprint: 1939], 15; Kenneth Wiggins, *Anatomy of a Siege: King John' Castle, Limerick, 1642* (Wicklow: Wordwell, 2000), 220-22; Szalontay, "The Art of War During the Ottoman-Habsburg Long War", 117-121; Şakul, "Ottoman Siege Warfare", 298; idem., *Çehrin Kuşatması 1678*, 98, 103.

the fortress did not end the siege, for improvised inner fortifications continued to delay the Ottomans considerably. Had the Ottomans at Vienna succeeded in detonating their final mines and opening the large breach they anticipated, on the night of the Battle of Kahlenberg, the defenders were nevertheless prepared to resist behind a second line of defense, just as at Candia and Chyhyryn.[27]

The Ottoman Divergences

Psychological warfare was also part of siege wars. Usual methods included night raids and nighttime bombardment. In the siege of Chyhyryn, the Ottomans terrorized the civilians by discharging heated cannon balls into the wooden town, reducing the whole town to ashes. The red-hot shots were among the realities of early modern siegecraft with mixed reception: Vauban objected to them because they terrorized the non-combatant civilians while Louis XIV favored them precisely because of it. In the 1672 Ottoman siege of Kamianets-Podilskyi, the Ottomans attacked the stone-built town by shooting solid balls. As splinters of rock poured down on the people, great panic reigned in the town at midnight.

One intriguing issue is the surrender with marks of honor. It was becoming something of a tradition in Europe by the mid-17th century to grant safe conduct to the capitulated garrison and to let them exit from the fortress fully armed and in procession. This was an acknowledgement of the brave resistance of the garrison. Thus, in the sieges of Érsek-Úyvár and Kamianets-Podilskyi, the garrisons requested permission to march out with such marks of honor. But, in Ottoman warfare, marching out in such pomp and ceremony was despicable because there was nothing to take pride in defeat. Nevertheless, Fazıl Ahmed Pasha let these defeated garrisons have their way although he disapproved their notion of military honor.[28]

There is a common criticism about the absence of simultaneous feigned assaults on several bastions at the siege of Vienna. This would have surely put a strain on the undermanned garrison and weakened the defense of the actual

27 Şakul, *II. Viyana Kuşatması*, 350-51; John Stoye, *The Siege of Vienna* (New York, 1966), 242-43, 250.

28 Şakul, "Ottoman Siege Warfare", 298-99; idem. "Siege Warfare in Verse and Prose", 233; Ostwald, *Vauban Under Siege*, 224.

target. However, the topography rendered Vienna unassailable from most directions, leaving the sector between the Burg and Löbl bastions the only viable option. However, the Ottomans aptly resorted to diversionary attacks at the sieges of Érsek Ujvár, Candia, Kamianets-Podilskyi, and Chyhyryn.

A significant divergence from the European practice was the lack of circumvallation. The Ottomans relied on the Tatars and light cavalry to keep the relief forces at a distance than guarding their military camp by the ancient Roman custom of circumvallation. Although palisading was not unknown to the Ottomans as suggested in 1694 (siege of Waradin), they usually chose either to stay and accept battle or lift the siege altogether once the relief force threatened the army camp. This seems to have two primary reasons. Ottoman military camps were usually too large to fortify, given the figures of the combatants and non-combatants. At Vienna, there was neither sufficient manpower nor popular commitment to war to accomplish such a daunting task. The arrival of a relief force was not an oddity in siege warfare. The Ottomans had to confront relief forces in the sieges of Érsekújvár (1663), Zrinyí-Újvár (1664), Candia (1667-1669), and Chyhyryn (1678). But the sheer size and combat motivation of the relief force in 1683 was unexpected. The division of the army into two halves in a siege was a calculated risk for Kara Mustafa Pasha. He gained victory at Chyyryn by keeping his elite janissaries in the trenches while fending off the Muscovite-Cossack relief force by large cavalry forces including the Tatars. His predecessor Fazil Ahmed Pasha employed the same tactics successfully at Zrínyi-Újvár (1664) against Montecuccoli. In both cases, Prince Romodanovski and Montecuccoli were reluctant to throw their troops into a risky battle. They needed to keep their armies undamaged to defend Kyiv and Vienna against a possible Ottoman offensive. Relying on these precedents, Kara Mustafa Pasha imposed his will to continue the siege of Vienna and ordered fencing off the relief army until the detonation of the new mines. But he overlooked the fact that the relief force was motivated for an all-out attack since they considered Vienna the last bastion of Christianity.[29]

29 Şakul, "Warum die Osmanen 1683 scheiterten", in Michael Hochedlinger (Hrsg.), *Der große Türkenkrieg, 1683-1699*, 191-97; for a comparison of the tactics of relief armies at Chyhyryn and Vienna see D. Fedosov, "COlonel and Engineer versus the Sublime Porte", in *Diary of General Patrick Gordon*, v. 3, vii-xviii.

Conclusion

This article has attempted briefly to introduce the principal techniques of Ottoman siege warfare during the Köprülü Era. These techniques interacted closely with the methodical siege warfare that was simultaneously emerging in Europe and attracted the attention of European specialists. Geostrategic view that compares the Ottoman Empire with its immediate rivals in different war theatres, topographical features, climate, and geopolitics seem to be the decisive factors. An overview of the stages of the siege reveals that Ottoman and European ways of siegecraft did not constitute binary opposition regardless of a number of differences. It appears that mining and sapping were the favorite tactics in Ottoman sieges in this period as opposed to breaching and storming. The existence of a separate corps of miners and sappers in the Ottoman army since the early centuries may have resulted in the accumulation and systematization of knowledge in a professional discipline over the course of time. Although the Turkish sources credited the commanders with the victory, they are also sympathetic to the hardships of professional miners, sappers, and the trench troops. It is part of the Ottoman siege vocabulary to praise them as "the men who took stone and soil for a pillow and comforter." The Ottoman siegecraft also diverged from its European counterpart in the command structure. The army topbrass was expected to stay close to their men in the trenches night and day. Moreover, the Ottoman military tradition had not yet embraced the procedure in which the surrendered garrison marched out from the fortress in military procession although more research is needed on this topic. Most of the elements in Ottoman and European siegecraft, however, were similar. These included basic siege methods such as the three-parallel approach and the equipment.

In the following pages:
Siege and liberation of
Wien in September 1683
Monumentalgemälde im
Heeresgeschichtlichen
Museum Wien (Foto selbst erstellt)

A history of Native fortifications In North-Eastern America

by Jason W. Warren

I
Fortify, Fight, Flee, or Cooperate

A history of Native fortifications concerns evaluating historical military options. How did indigenous groups react when faced with a stronger, and sometimes more advanced, military power? Wayne Lee delineates Native military options as Fortify, Flight, or Flee;[1] these can be applied across time and space with a global point-of-view. How Native Americans resisted colonization is similar in many ways to how the Scythians resisted Alexander the Great, the Celts Rome, the Zulus Great Britain, the Herero the German Empire, and the Aztecs the Spanish Habsburgs. The additional option of cooperation should be added to Lee's compilation of resistance types, which could also represent a shift from confrontation to cooperation when defeat was evident.

Military options are bounded by material and political realities, and this is the case with Native reactions when faced with stronger military invaders. Native groups' calculus of military options revolved around the determination over fortifying existing settlements, strong points, or material production centers; fighting it out in battle against superior technologies and sometimes numbers; fleeing into the remote wilderness; or cooperating with a stronger military power to ensure survival. The first three military possibilities were almost never a matter of a good choice versus a poor one, but rather choosing between different fraught courses of action. A determination of cooperation could mean limited

1 Wayne E. Lee, *The Cutting-Off Way: Indigenous Warfare in Eastern North America, 1500-1800* (Chapel Hill, NC: University of North Carolina Press, 2023), 98.

Native sovereignty or its outright elimination. Native Americans attempted all three variations of combating colonization, as well as cooperation with the newcomers, and sometimes they attempted all four options across time.

In Northeastern America, as described below in "Satellites and Alliances," many Native groups in the Eastern Woodlands attempted to fortify villages, wampum production centers, and blacksmiths' forges. Generally, Natives transitioned the hilltop fortresses of the contact epoch into mini-European forts in deep swamps in subsequent decades. The fortification strategy produced varying results, depending on Native alliances and availability of kin to relieve besieged forts. Sometimes, as in the case of the Susquehannocks, Western Abenaki, and Mohegans, the Native group repelled the invaders, at least for a length of time. In other cases, such as with the Narragansetts Great Swamp, colonial military power was brought to bear successfully, if at great cost to the attackers.

Eastern Woodland Native groups, such as the Pequots against the Dutch in Connecticut, often avoided fighting the European colonial powers in the open field. This was due to a lack of firearm equivalency in some periods, but at other times it was a preference to keep casualties low from direct engagement. Indian war bands also lacked collective training necessary for linear battle, where the inaccurate smoothbore muskets could be brought to bear more effectively through volley fire.

Other Eastern Woodland groups sought to employ the "flee" strategy, including the Mohawks when faced with French regulars and their Indian allies, as well as the Pequots in the initial contact era before becoming allies of the English. Fleeing worked to a varying degree, but often made noncombatant populations more vulnerable, as they lacked the mobility and hardiness of warriors on the warpath. The Narragansetts after the battle at Great Swamp abandoned most of their fortresses, leading to great suffering and death, as well as capture of many Indians. In 1756 during the French and Indian War (Seven Years War in Europe), Pennsylvania forces attacked a fortified Delaware village at Kittanning in central Pennsylvania, and even this fortress was less advanced than the Eastern Woodland forts of the previous mid-century.[2] The Delaware eventually attempted a flee strategy into the Ohio country and beyond.

2 Lee, *Cutting-Off Way*, Figure 6.1, 154.

The best option for Native groups in the Eastern Woodlands in terms of survival in the mid-term was cooperation with the newcomers. Uncas of the Mohegans, Ninigret of the Eastern Niantics, and the Mohawks all sought cooperation with the English military colossus, and hence survived and even gained followers, captives, and prestige in the near-term. These Native groups, like others, however, ultimately suffered casualties by fighting for the colonists in the colonial wars, and also through dangerous occupations like whaling, and this decreased their population base over the longer term. Eventually, these groups intermarried other socially marginalized groups, such as freed blacks and Scots-Irish, and ceased being distinct populations. Others migrated onto reservations for survival in the United States and Canada.[3]

Native groups fleeing the Eastern Woodlands or originally from the trans-Mississippi utilized the fortify strategy less, if at all, relying on fighting and then fleeing, and in some rarer cases, immediate cooperation with white expansion. This was due in a large part to differences in sustenance and material production, as these groups had less static resources to protect. The natural terrain of the "American steppe" also provided enough distance from colonizers to flee into for many decades before railroad and population increases decreased the ability to flee to uninhabited areas.

The Plains Indians relied on hunting, especially buffalo, rather than more settled agriculture, and could thus follow the herds away from advancing Americans, at least until the buffalo were over-hunted. The Dakota on the northern Plains and the Comanche on the southern Plains were especially adept at surviving on the American steppe. The Comanches even maintained an empire, stretching deep into Mexico.[4]

Native groups facing expansive military powers on other continents relied on similar strategies as Native Americans. The Scythians famously survived numerous empires from the Persians to Alexander the Great and beyond by fleeing into the steppe. Relying on the natural grasses of the great-Eurasian-central landmass, Scythian horses could graze across gigantic spaces and hence flee from pursuers indefinitely. In the case of Alexander the Great, the young emper-

3 For a discussion of fortifications in the Eastern Woodlands see §. II.

4 Pekka Hamalainen, *The Comanche Empire* (New Haven, CT: Yale University Press, 2008).

In the following pages:

Colored version of Theodor de Bry's engraving of Roanoke Indian Village of Pomeiooc in North Carolina, originally published as an illustration in Thomas Hariot's 1588 book entitled "A Briefe and True Report of the New Found Land of Virginia. Wikimedia Commons (*Historia Americae : sive Novi orbis*. Continens in XIII. distinctis partibus verissimam, exactissimam, et admirandam descriptionem, vastissimarum, et mvltis abhinc seculis incognitarum terrarum, quae patrum memoria primum detectae, nunc passim Indiae Occidentalis nomine vulgo vsurpantur.... - Francoforti ad Moenum : typis Ioannis Wecheli : sumptibus vero Theodor de Bry; et al., 1590-1634. - 13 partes : il.; 2º (38 cm)

or was forced to rearrange his fighting formations to adapt to Scythian raiding parties, relying less on Macedonian infantry and more on local allied forces of cavalry and archers as he approached India.[5]

Other mounted steppe Native groups of later eras, such as the Avars, Huns, Turks, Mongols, and Cossacks employed a similar flee strategy to take advantage of the steppe and operational mobility. Military strategies changed, however, when these groups invaded European woodlands and adopted more settled agriculture or ruled as a warrior caste over those who performed agriculture for them. Once settled with agricultural and related urban areas to protect, fortifying and fighting became their dominant military strategies. This was the opposite succession of strategies than in Native America, which fortified first, and fled later over time, moving from the Eastern Woodlands to the American steppe.

The Gauls, a Celtic ethnic group adjusted to their migration into the highlands and woodlands of Europe. There they adopted similar military strategies to those the Eastern Woodland Native Americans would eventually adopt, fortifying critical urban and agricultural strongholds. This was showcased by Cae-

5 Jason W. Warren, "Avoiding Nation Building in Afghanistan: An Absent Insight From Alexander," *Brill's Companion to the Reception of Alexander the Great*, ed. K.R. Moore (Leiden, Netherlands: Brill, 2018), 742-743.

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sar's epic siege of the Gauls' city of Alesia,[6] in what is now central France, as well as other battles and sieges like it.

Others Celts cooperated with the strongest military power—the Romans—and assisted Caesar and other Roman military leaders in conquering other Celtic and Germanic peoples. Like Native Americans, the Celts overtime were conquered or fled into remote and inaccessible regions like the Scottish highlands, Irish swamplands, or Iberian mountains.

The early Britons too used a number of different strategies when Caesar twice invaded what became England. During the first invasion, the Britons contested the landings. After the Romans successfully established a basecamp on the island, these coastal Britons attempted to cooperate or at least they did until realizing the vulnerability of the Roman food supply. They then opted to fight again, and Caesar ultimately withdrew to the continent for the winter.

Caesar returned the following year with a much larger contingent, and just as the Eastern Woodland Indians eventually would redeploy into swamps, the Britons relocated into deep forests. There they resisted with fortifications. The Romans, however, experienced in taking fortresses on the continent, defeated the forts. In one case, the Seventh Legion employed the famous tortoise shell to maneuver close enough to penetrate into the Britons' fortress.[7]

On other continents, Native groups observed similar patterns of military options. The Zulu of Africa, when faced with expansionist British military power in the late-nineteenth century, opted to fight, and achieved some notable military successes, such as at iSandlwana. The Zulu opted to use their effectiveness in mobile warfare to attempt to defeat sparse and isolated British forces, which worked temporarily, but faced set-back at fortified Rorke's Drift. However, the British military might and global power eventually overcame the Zulu, who were divided and occupied, forced to cooperate with British rule.[8]

The Herero of southwest Africa, attempted to resist Imperial Germany. This Native group opted for a strategy of fighting and then fleeing into a desert, where

6 Julius Caesar, *War Commentaries*, trans. Rex Warner (New York: Mentor Books, 1960), 170-181.

7 Julius Caesar, *War Commentaries*, 82-93.

8 Ian Knight, *Zulu Rising: The Epic Story of iSandlwana and Rorke's Drift* (London: Pan Books, 2011).

Indorum alij Occiduntur alij incendio pereunt (Some of the Indians Are Killed, Others Die in the Fire). From Theodor de Bry, 1594, plate 18 Internet archive Public Domain.

the Germans may have intentionally helped push them, knowing survival would be impossible. Thousands died of dehydration and only a few hundred made it across the desert or slipped back through German lines. German behavior in this war is widely considered as genocide against the Herero people.[9]

9 Isabel V. Hull, "German Military Culture and the Colonial War in Southwest Africa," *Warfare and Culture in World History*, ed. Wayne E. Lee (New York: New York University Press, 2011), 143-164.

Other African Native groups when faced with either Islamic or European Christian colonialism, chose to flee into the dense jungles of the sub-Sahara or even the desert. The disease vectors in the jungles, especially for non-Natives, when coupled with a lack of infrastructure to facilitate military movement, often preserved Native sovereignty over long periods. Eventually, as was the case in other inhospitable environments, Europeans overcame these natural obstacles and colonized the entire continent.

South America also showcased a wide-array of resistance or cooperation with European colonialism. Aztecs alternated between strategies of cooperation or feigned cooperation, fleeing from or resisting Spanish Habsburg invasion. The initial conquistadors found success with the novelty of horses, which the Natives had never seen before. As they traversed from the coastal areas inland, Cortes's forces witnessed fortifications "on a level with similar works in Europe."[10] A major determining factor of success was alliances with Indian allies who detested Aztec dominance.

The Spanish were less successful, however, within the great expanses of the North American continent. They never succeeded in subduing large areas apart from Florida and what became California and the American southwest. Spanish colonialism also relied on cooperation, and many Native groups were either subdued into cooperating or did so out of a sense of survival, even if this cooperation meant that Native culture was subsumed by Spanish Catholicism—at least on the surface.

The fortify, fight, flee, or cooperate paradigm applies to Native groups reacting to perceived superior military power across time and geographic expanses. Native groups chose military options based on protecting static resources and population centers or having the ability to flee into remote expanses where resources existed; usually into the steppe or deep jungles, where colonial powers lacked the military reach to interfere with Native life. Other Native groups adopted varying degrees of cooperation, in order to survive and maintain sovereignty. The following chapters illustrate some of these military choices, especially in terms of deciding to fortify or not, often with nearby kin and alliances as a basis, but always with Native group survival as the main strategic objective.

10 As quoted in William H. Prescott, *History of the Conquest of Mexico & History of the Conquest of Peru* (New York: The Modern Library, 2001), 218.

II

Satellites and Alliances: The Density of Fortifications Undergirding Native American Defenses

Great Swamp Fight

The colonists stared in disbelief at the Narragansetts' fortress rising suddenly out of the heavy snowfall and mists of the deep primordial swamp they had just crossed. The colonial army—the largest in New England until Bunker Hill one hundred years later—had marshalled on the coast of Narragansett Bay. A Native American guided the army through the foreboding wetlands. Without his knowledge of the swamp, and the fact that it had frozen over during this brutally cold New England winter, the colonists may never have reached the carefully hidden fortress. When they did reach this island of dry land at barely above water-level surrounded by hundreds of acres of wetlands, they were appalled at the European-like fortress that they would have to assault, after their treacherous march.[11]

Abatis of fallen trees and bushes surrounded the fort, which was further enclosed by a stout palisade erected over a ditch or moat. Flankers and blockhouses covered the log curtain walls to provide the defenders the advantage of enfilading fire. There were a number of well-covered entrances to the fort, and the English assailed one repeatedly under the muskets of the Narragansetts, only to be driven back to the edge of the morass. Part of the rear-guard, witnessing the slaughter, made its way to the opposite end of the fortress, which was less guarded, and had palisades spaced in such a manner as to allow for these troops to slip through. Once they formed and attacked the Indians in the rear, the pinned-down English at the front of the fort commenced their attack, and pushed through the palisades. Even then the Narragansetts and colonists exchanged point-blank fire until the Indians gave way, but at great cost. Hundreds on both sides died during the battle and subsequently from wounds.[12]

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11 This chapter began as a memorial conference paper for my graduate advisor, Dr. John Guilmartin Jr., presented at The Ohio State University, 24 September 2016. The author wishes to thank Drs. John Bonin and Lawrence Tritle, and Ms. Ann Henry for commenting on drafts.

12 The above description of Great Swamp comes from the author's interpretation of the following

Adaptation, Density, and Alliances

The colonists attacked the Narragansett fort at Great Swamp on 19 December 1675, during the Great Narragansett War (a.k.a. King Philip's War).[13] This fort was neither unique in this, one of America's bloodiest conflicts, nor even by the mid-seventeenth century. Natives had altered both their tactics in battle, as well as their fortification design and locations to account for both colonists and Indians armed with flintlock muskets. The general transition of the Native's circular-palisaded forts on accessible hilltops meant to thwart arrow-bearing enemies, to mini-geometric fortresses hidden in barely accessible terrain, was meant to account for the arrival of European firepower in the New World.

While other historians generally have discussed this military transition, they have overlooked the density of Indian forts as a critical aspect of Native defensive systems. Any fortress at any time in history would fall without a timely relief force, and it was this factor that caused Native northeasterners to build fortresses in supporting range of each other. As the critical factor for the survivability of forts was the proximity of a relief force, this was why density of fortresses mattered. The Indian forts at Great Swamp (West Kingston, Rhode Island), Mohantic (Foxwoods, Connecticut), the Susquehanna River (Pennsyl-

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sources, as well as discussion with archaeologist and anthropologist Dr. Kevin McBride, who has conducted archaeological digs on the site. The author also walked the terrain on 17 January 2026, a few weeks after the 350th-anniversary of the battle: John S. Barry, *History of Massachusetts*, in Herbert M. Sylvester, *Indian Wars of New England*, vol. 2 (Westminster, MD: Heritage Books, 2008, reprint 1910), 286; William Hubbard, *Indian Wars in New England*, (Norwich, CT: John Trumbull, 1677), 107, https://books.google.com/books?id=RNIZeOP-5w30C&printsec=frontcover&dq=William+hubbard,+a+narrative+of+the+Indian+wars+1677&hl=en&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwjKj4vZwKaOAxW1v4kEHdlmAS4Q6AF6BAgFEAM#v=onepage&q=lathrop&f=false, accessed 5 July 2025; Elizabeth H. Schenck, History of Fairfield, Fairfield County, Connecticut, vol 1. (New York: by the author, 1889), 188, accessed May 2023, Googlebooks; Benjamin Church and Thomas Church, *The Entertaining History of King Philip's War…et al.* Boston: 1716 second edition), 25, https://quod.lib.umich.edu/cgi/t/text/text-idx?c=evans;cc=evans;rgn=-main;view=text;idno=N09706.0001.001 , accessed 17 July 2025; Benjamin Trumbull, *A Complete History of Connecticut: Civil and Ecclesiastical*, vol 1. (New Haven, CT: Maltby, Goldsmith and Co., and Samuel Wadsworth, 1818), 339, https://www.google.com/books/edition/A_Complete_History_of_Connecticut/nR4wAAAAYAAJ?hl=en&gbpv=1, accessed 10 February 2026.

13 Jason W. Warren, *Connecticut Unscathed: Victory in the Great Narragansett War, 1675-1676* (Norman, OK: University of Oklahoma Press, 2014).

Das dritte Theil. 35

XXIX. Capittel.

Wie die fünff vnd zwentzig Nachen der Tuppin Ikins ankamen/davon ich dem König gesagt hatte/ vnd wolten die Hütten anfallen darinn ich war.

Zu jrer zeit begab es sich/ daß die fünff vnnd zwentzig Nachen/ der Art Wilden/ welche die Portugaleser zu Freunde haben. Auch wie ich vor gesagt hab/ ehe ich gefangen wurd/ dieselbigen in willens waren dahin zu Kriege zu fahren. So begab es sich/ daß mal eines Morgens/ daß sie das Dorff anfielen.

Wie nun die Tuppin Ikins diese Hütten wolten anfallen/ vnd begunten zu

F ij hauff

The Tuppins and Ikins, of whom I had warned the King, are attacking the village where I was staying, and are attempting to plunder the tents where I was staying.

vania), Piscataway (Maryland), Fort Hill, (Hinsdale, New Hampshire), Pound Ridge (New York), Ninigret's Fort (Charlestown, Rhode Island), Fort Shantok (Ledyard, Connecticut), the Mohawk River Valley forts (New York), and Long Island (New York) forts, exemplify these changes within the greater epoch of Native military transformation due to colonial arrival.

Alliances were as pivotal for military efficacy as they were in Europe. Prior to Great Swamp, local Rhode Islanders were the only colonial support for the Narragansetts. Unfortunately for the Narragansetts, these Englishmen were pacifists, failing to deter the aggressive military power of the nearby Puritans. Also in northeastern North America, the Mohawks relied on their alliance with the Dutch and later the English to protect their population against the French and their Indian allies. The Connecticut colonists directly supported the Mohegan's Fort Shantock in a number of instances. Thus, nearby kin and alliances—which operationally should be viewed as a dense network of support—were often the crucial elements for the Natives' defensive systems.

Native Americans were reacting to changes in military technology from Europe that allowed for the projection of power from that continent. From the fifteenth century, Europeans introduced new military technologies that profoundly affected military operations. Harnessing improvements in metallurgy and casting, Europeans produced mobile artillery pulled by horses on campaign. Lighter and robust cannon rendered Medieval castles obsolete by undermining their vertical stone walls. This design vulnerability with the advent of mobile artillery, in turn, led to new layouts of fortresses that favored low-earthen-angular walls and outworks for enfilading fire over the towering stone versions. The introduction of new artillery also affected naval affairs, when the lighter guns were mounted on sea-going vessels. The new guns, along with improved navigational techniques, allowed for Europeans to project power into unsettled areas, initiating an age of colonialism.[14]

14 The "military revolution" debate is a notable theme in the field of military history. See: Jeremy Black, *Beyond the Military Revolution: War in the Seventeenth Century World* (London: Palgrave Macmillan, 2011); Wayne E. Lee, *The Cutting-Off Way: Indigenous Warfare in Eastern North America, 1500-1800* (Chapel Hill, NC: The University of Chapel Hill Press, 2023), entitled a chapter: "The Military Revolution of Native America," 143; Geoffrey Parker, *The Military Revolution: Military Innovation and the reside of the West, 1500-1800* (Cambridge, UK: Cambridge University Press, 1988); Clifford J. Rogers ed., *The Military Revo-*

Those Native peoples on the receiving-end of this European interjection into local affairs did not remain passive in the face of these uninvited newcomers. In the case of Algonquian groups of the seventeenth-century Eastern Woodlands, Natives often removed easily observable forts—which were vulnerable to this new firepower—into tenebrous and inaccessible swamps. These new structures were geometric to harness flintlock-musket capabilities, as Natives rapidly incorporated European small arms into their military systems.[15]

The Indian population had overhauled these military systems since the initial post-contact conflicts, fought in the first third of the 1600s. David Silverman in *Thundersticks* describes this transition: "Indigenous people answered this threat [firearms] by replacing their circular palisades with straight-wall fortifications that gave defensive gunman clearer shots at attackers."[16] Wayne Lee's *Cutting-Off Way* synthesizes his previous arguments about fortifications, including that Eastern Woodlands Native peoples adopted geometric-patterned fortresses. Lee also asserts that the final state of the Native American response was to abandon failed fortification systems for better operational mobility. While accurate, the downside of this "flee" approach was to sacrifice Indian homeland, crops, and cached supplies; hence, fleeing was not ultimately a winning strategy. Lee also highlights the clustering of Indian towns.[17] A number of historians have highlighted the adaptation of native bastions to altered post-contact conditions.[18]

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lution Debate: Readings on the Military Transformation of Early Modern Europe (Boulder, CO: Westview Press, 1995).

15 Patrick M. Malone, *The Skulking Way of War: Technology and Tactics among the New England Indians* (New York: Madison Books, 1991), detailed the incorporation of flintlock muskets into indigenous military systems, and Wayne Lee, David Silverman, the author, and other early American military historians have modified his argument.

16 David J. Silverman, *Thundersticks: Firearms and the Violent Transformation of Native America* (Cambridge, MA: The Belknap Press of Harvard University Press, 2016), 24.

17 Lee, *The Cutting-Off Way*, 5-10; 146-150.

18 Guy Chet, *Conquering the American Wilderness: The Triumph of European Warfare in the Colonial Northeast* (Amherst, MA: University of Massachusetts Press, 2003), 5; Jon Parmenter, *The Edge of the Woods: Iroquoia, 1534-1701* (East Lansing, MI: Michigan State University, 2010), 116; Malone, *Skulking Way of War*, 73-74; Ian K. Steele, *Warpaths: Invasion of North America* (Oxford, UK: Oxford University Press, 1994), 102; Armstrong Starkey, *European and Native American Warfare 1675-1815* (Norman, OK: University of Oklahoma Press, 1998), 24, predates Lee's argument that fleeing was the better strategy; Matthew J. Tuininga, *The Wars of the Lord: The Puritan Conquest of America's First People* (Oxford, UK: Oxford University Press, 2025), 290; Warren, *Connecticut Unscathed*, 134-135;

As in the case of Europe, Indians erected fortifications withing supporting distance of each other to facilitate relief.[19] While describing the Indians' military transition to flintlocks, scholars have missed the density of fortresses, which reveal a clear pattern of eastern American Natives employing a technique of matching a larger fortress with a smaller, satellite fortress.[20] This was the case, in addition to Great Swamp, at Shantock, in the Mohawk River Valley, at Hinsdale, and on eastern Long Island with likely other satellite forts that archaeologists have yet to locate. Sometimes, roughly equal sized fortresses were also built nearby, such as the case of the Pequots during the Pequot War at Mystic and Weinshauks, and then latter with the reconstituted Pequots at the Mohantic forts during the Great Narragansett War. The distance between supporting fortresses was usually between 2.5-3.5 miles,[21] which likely signified the jogging distance (sprinting for miles before fighting would have been counterproductive to combat performance) a warrior could cover in enough time to relieve a beleaguered fort.

This density of forts allowed for mutual support in times of extreme danger. At both Mystic in 1637 and Great Swamp in 1675, Native warriors responded to colonial attacks from adjacent fortresses, preventing perhaps even more carnage to the besieged Indian populations. Fortresses were never meant to serve as permanently impenetrable structures. Without relief, the besieged food supply would dwindle, disease would spread with refugees swelling population concentration, and defenders' morale would likely collapse over time. Sometimes, the besieging force would defeat the relief force or simply overcome the defenses with better counter-engineering or by rapidly storming the works.[22] An accurate

19 Lee describes the distance between Mohawk forts as six-fifteen miles, *Cutting-Off Way,* 25, but as described herein, the satellite forts were closer, usually 2.5-3.5 miles apart to facilitate rapid relief.

20 While Lee, *Cutting-Off Way*, 5-10, indicates the density of Native group villages, he does not highlight, however, how this density allowed for the relief of forts with a satellite fortress in supporting range of a larger fort.

21 The author estimated the rough distances on Google Maps accounting for existing trail networks, not just "as the crow flies" distances, as well as from extant sources noted herein.

22 Three sieges in European history exemplify these points. Thucydides, *The Peloponnesian War*, trans. Steven Lattimore (Indianapolis, IN: Hackett Publishing Inc., 2002), Books 1-2, 8, related that Pericles at Athens during the Second Peloponnesian War convinced, with difficulty, the Athenian population to retreat inside the walls of the city. The swelling population

analysis of Native defensive systems thus does not just concern the structure or location of a particular fortress alone, but the individual fort's integration into a system of defense that considered other nearby fortresses of kin or allies.

During the first post-contact wars, Native groups retained hilltop fortresses of a circular construction originally designed to thwart arrow-bearing adversaries. The size of these fortresses altered with population concentration due to increasing trade ties between peoples. The sixteenth century witnessed Indian centralization of power.[23] The thriving fur-wampum trade (wampum were white-purple seashells used as currency and to signify social status) of the seventeenth century aggregated prestige and power among the Native groups that effectively dominated their rivals.[24] Anthropological-archaeological surveys confirm that wampum manufacturing facilities or wampum remains were often located within the walls of Native fortifications.[25] The increased concentration of population for the wampum and fur industries also harnessed available labor for more complex fortification construction.

While Lee is ambivalent about the archaeologists' general view that the In-

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caused plague with many perishing. The Athenians' morale collapsed as they witnessed the destruction of their farms outside of the walls, leading to an overthrow of the Periclean regime. In the long-term, a Persian-financed-Spartan fleet obtained sea-control and ended the war by severing the Athenian population's food lifeline to the Black Sea. Also in the ancient world, Julius Caesar, *War Commentaries of Caesar*, trans. Rex Warner (New York: The New American Library, 1960), 170-181, describes the successful siege of Alesia. By building lines of circumvallation (focused towards the fort) and countervallation (aimed at a relief force outward from the lines of circumvallation), Caesar prevented the relief of the city, causing its surrender and the humiliation of its combatants. The siege of Magdeburg (Thirty Years' War), featured like Great Swamp a *coup de' main* or storming of the main works without a prolonged siege, resulting also in many non-combatant deaths. See: John Childs, "Warfare in the Seventeenth Century," *Smithsonian History of Warfare*, John Keegan ed. (London, Cassell, 2001), 56-58.

23 Kevin McBride, "Fort Island: Conflict and Trade in Long Island Sound, "in *Native Forts of the Long Island Sound Area*, ed. Gaynell Stone, vol. viii (New York: Sheridan Books, 2006), 260. This source is a compilation, partially, of archaeological and anthropological primary sources.

24 Wampum were precious seashells with monetary value, as they denoted royalty and power among Indians, and the colonists also used it as currency through the mid-seventeenth century. For a discussion of the wampum trade see McBride, "Fort Island," 256-260.

25 Ralph Solecki, "Native Forts of the Mid-Seventeenth Century in Southern New England," in *Native Forts*, 6; Gaynell Stone, ed., "Introduction," *Native Forts*, vii.

dian fortresses were designed to protect wampum manufacturing,[26] increasing centralization of political power and industry motived Natives to protect material with more elaborate defenses. There are only a few reasons why Native Americans made this significant effort, and to protect the burgeoning wampum and fur trade was a primary explanation. Indians also protected population and other scarce resources like Native blacksmiths' forges within the walls of their fortresses.[27] Natives may have constructed their fortresses for any of these reasons alone or in combination, but historians should not shy away from such conclusions.

Pequotia

The Pequots maintained such a wampum emporium in southern New England, Pequotia, ranging from the Pawcatuck River in the east, to Long Island in the south, and the Housatonic watershed in western Connecticut. The Pequots, the Native group with the most effective military reach east of Mohawk country, dominated their more numerous ethnic and cultural relations in this region. After suffering losses from disease and then skirmishing with the Dutch in 1634, the Pequots ran afoul of the English in 1635-36, the latter of whom were encroaching on the Native group's dominion. The Pequots' hilltop fortresses—impregnable to other Natives groups who were fearful of Pequot military power—did not intimidate the English. Two of these Pequot fortresses were within two and a half miles of each other, allowing for rapid relief should adversaries besiege one of them.

Two expeditions, at least temporarily, drove the Pequots and their tributaries from their fortified villages. The third in 1637, delivered the *coup de' grace* at Mystic Fort in Connecticut, where the colonists, led by Thirty Years' War veteran Captain John Mason, immolated an estimated 300 non-combatants. Demonstrating the effectiveness of fortresses and villages within supporting range, the Pequots reinforced their Mystic Fort in the hours prior to the battle. This reinforcement almost destroyed the colonial force. The hand-to-hand engagement inside the palisades and the fighting withdrawal also left approximately 500

26 Lee, *Cutting-Off Way*, 147.

27 McBride, "Mohantic: The Pequot in King Philip's War," in *Native Forts*, 331.

Wie der Floridaner Stätte XXX. erbauwet seyen.

SO pflegen die Indianer ire Stätte auff diese weise zu bauwen/ Wann sie einen Platz bey einer fürüber fliessenden Bach erwehlet haben/ machen sie denselbigen/ so viel es ihnen müglich ist/ eben/ vnd eine gar rondte Furche herumb/ nachmals schlagen sie dicke vnd rondte Pfähle/ zweyer Männer hoch/ zusammen in die Erden/ vnd da man in die Statt gehen sol/ daselbst hin ziehen sie es rondt/ vnd Schneckenweiß/ zusammen/ auff daß sie den Eingang der Statt desto enger machen/ vnd auff einmahl nicht mehr dann zween hindurch passiren können. Sie leyten auch die Bach zu demselbigen Ort hinzu. Vornen am Eingang pflegen sie ein kleines rondtes Häußlein zu bauwen/ darnach noch ein anders/ da sich dieser Ort endet/ vnd sind diese beyde Häuser rondt herumb voll Ritz vnd Löcher/ vnd also/ nach Gelegenheyt deß Landes/ gar herrlich gebauwet. In diese Häuser werden solche Leute zu Hütern gesetzt/ welche die Fußstapffen der Feinde von ferne riechen können. Dann so baldt sie die Fußstapffen durch ihre Naßlöcher vernemmen/ gehen sie jnen entgegen/ Vnd wann sie die Feinde antreffen/ fangen sie alsobaldt an mit heller Stim̃ zu schreyen/ wann dann die Einwohner dises Geschrey erhören/ lauffen sie in Eile/ mit Bogen/ Pfeilen vnd Spiessen bewapnet/ die Statt zubeschützen/ zusammen. Deß Königes Hauß stehet mitten in der Statt/ vnd von wegen der Sonnen Hitze/ ein wenig in die Erden hinein gebauwet/ vmb dieses herumb stehen die Häuser/ deren vom Adel/ mit Palmenzweygen fein dünn gedecket/ Dann sie gebrauchen sich derselbigen nur neun Monat/ die andern drey Monat bringen sie (wie gesagt) in den Wälden zu/ auß welchen/ wann sie darnach wider kommen/ ziehen sie widerumb in diese ihre Häuser/ Wann sie aber sehen/ daß sie durch ihre Feinde abgetrangt worden/ so bauwen sie andere/ diesen gleich. Sehe/ also prächtig vnd köstlich sind der Indianer Palläst.

Wie sie

Indian warriors dead or wounded on the field of battle, however, or half of the Pequot fighting force. In their rage over non-combatant losses, the Pequots had abandoned their tactics of the half-moon attack,[28] which were effective against muskets.

The Pequots had employed this traditional Indian tactic previously in the Dutch war, but deviated from it at Mystic, rushing headlong into a colonial musket volley. It was this tactical error that undermined the effective density of Pequot fortresses. If the Pequots had patiently skirmished with the English and their Indian allies as they had with the Dutch, then they would have cut-off Mason's force before it reached the ships (though they would have still lost the one fort and many non-combatants).[29] The Pequots never recovered their former power, although the remainder of the Native group proved very effective as English allies in later wars.[30]

Northern Delaware

Less than a decade later in the lower Hudson Valley, not far removed from the scene of the massacre of Pequots at Mystic, northern Delaware Native groups resisted the Dutch in Kieft's War. The conflict originated with increased disputes over trade, and a blood vendetta carried out in accord with Native traditions, as well as a Dutch revenge attack. The Delawares retaliated by wiping-out outlying Dutch settlements, which were unprotected beyond the wall on what is now Wall Street in Manhattan, and a few other scattered bastions, including Fort Orange (Albany). The Dutch, cooperating still with the English prior to the Anglo-Dutch Wars, recruited Captain John Underhill. Underhill had led the supporting attack on Mystic, and like Mason, was a veteran of the wars in the Low Countries.

The southwest coast of Connecticut at this time remained under Dutch influence, and a Dutch contingent landed 130 men there at Stamford. The small army

28 See Lee, *Cutting-Off Way*, 32-33, for an explanation of half-moon tactics.

29 For Pequot War narratives see: Alfred A. Cave, *The Pequot War* (Amherst, MA: University of Massachusetts Press, 1996); John Gillingham, "Writing the History of the Pequot War, 1636-1637," *Historical Research* (Oxford, UK: 2025), 1-22; McBride, ed., "Technical Report," National Park Service American Battlefield Protection Program (GA-2255-12-011, 2025).

30 Warren, *Connecticut Unscathed*, 78-95.

set-out traveling by the light of the moon. Underhill's march included crossing multiple rivers and tangled terrain of hills and swamps. He then organized a similar assault to the Mystic attack against the Delaware's hilltop village, perhaps without a stockade (although the imposing cliffs the dwellings rested under served as de facto, impenetrable walls), in Pound Ridge, New York. This resulted in even more carnage than inside Mystic fort, with over 500 Indians killed. In similar fashion to the Pequot tactical error at Mystic, the Delaware had first attempted a front assault against the Dutch musketeers, and had lost over a hundred warriors. The Indians then retreated into their large rows of longhouses, and fought through loopholes in the walls before Underhill ordered the conflagration. The Delaware war effort collapsed in a fashion similar to Pequot resistance after Mystic.[31]

Fort Design

Native American communities throughout the eastern seaboard internalized these hard lessons of defeat and began transitioning their fortresses into mini-European fortresses, but usually without the cannon. Native design intended to harness the range of the newly acquired flintlocks, so each "curtain" wall (i.e. the straight line wooden palisade wall) was between the effective and maximum effective range of a musket or 50-100 yards in length.[32] The palisades were dug two to four feet into the ground to hold the individual shorn-trees upright, and make them less prone to attackers simply pushing them over. Sometimes, rocks were used to stabilize the palisades. Archaeologists are often only able to locate these ancient fortifications by the remnants of the palisade lines.[33]

Mini-bastions, as in Europe, protected this curtain wall, which allowed the defenders to fire their muskets down the wall to protect against penetration. These angular bastions, which jutted-out in front of the wall, were made of earth thrown up from the ditch in front of them, and could be reinforced with timber and stone. Indians sometimes used wooden blockhouses in place of the earthen

31 John W. De Forest, *History of the Indians of Connecticut: From the Earliest Known Period to 1850* (Hartford, CT: Wm. Jas. Hammersley, 1851), 207-208.

32 Mcbride, "Mohantic Fort," 323. The author has confirmed the wall length by pacing Mohantic.

33 Author conversation with McBride, 6 January, 2026.

bastions, requiring less digging. The inside portion of the ditch or moat was known in Europe as the scarp, while the opposite side of the ditch was known as the counterscarp. The ditches served as an additional obstacle, as attackers had to climb in and out of them under fire. The ditches also made the bastion walls higher.

On the other side of the counterscarp, sloping downward, was the glacis. These sometimes existed in Native America, as at the fortress at Great Swamp. The sloping ground made it more difficult for the attackers to observe the walls of the fort, while concealing the ditch. Occasionally, as also at Great Swamp, Indians emplaced felled trees and bushes down the glacis. This abatis caused the assaulting force to lose cohesion and waste time in negotiating the obstacles. Inside the fortifications, the Indians would emplace their wigwams or longhouses, and these often served as a final refuge for defense, as at Pound Ridge and Great Swamp, if the walls were breached.[34]

Conestoga

In the mid-Atlantic, the Iroquois Five Nations drove away from south-central Pennsylvania an ethnically related Native group, the Iroquoian Susquehannocks (a.k.a Conestogas), during the so-called Beaver Wars. Prior to the dispersal of the Suquehannocks temporarily to Maryland, the Indians in this area maintained a European-style fortress on a bluff overlooking the Susquehanna River that bears the Native group's name. The Iroquois of the then Five Nations' Confederacy (the Tuscorora Native group migrated from North Carolina in the eighteenth century making it the "Six Nations") reported that the fortress had two bastions and boasted cannon.[35]

The Seneca of the Five Nations Confederacy requested that the French build a similar geometric fortress for them in their traditional territory after encountering the Susquehannocks' fort.[36] There is some indication that earlier European colonists, either the Dutch or Swedes, who had settled colonies to the east-southeast of this area, had constructed the Susquehannock's fort for the purposes of

34 Childs, "Warfare in the Seventeenth Century," 141-150.

35 Silverman, *Thundersticks*, 42, 48.

36 Parmenter, *Edge of the Woods*, 116.

trade.[37] It was the presence of cannon that the Indians could not forge that makes later Native inhabitation of the site the most likely scenario. The first location of Susquehannock hilltop fortress was on the western side of the Susquehanna River that the Seneca eventually destroyed.[38] The second Susquehannocks' European-style fortress was on the eastern side of the river near Columbia, Pennsylvania. It was built after much of the Native group retreated back to Pennsylvania from Maryland and Virginia sometime after Bacon's Rebellion of 1676.[39]

When driven from Pennsylvania prior to 1676, the Susquehannocks temporarily regrouped further south at Piscataway, Maryland, also utilizing a similar, small-European-style fort for defense. The Native group had always had a presence in Maryland and had warred repeatedly with the English of the area. In one episode, the English were unable to besiege the Piscataway fort. It appears as in the case of the previously occupied European fort west of the Susquehanna River, the Susquehannocks occupied this fortress after the Piscataway Indians had vacated it. The fort was on sloping high ground located at the junction of Piscataway Creek and the Potomac River, overlooking the junction of the two bodies of water. The fort boasted bastions and linear configuration, and in the case of the Susquehannocks' Pennsylvania fort, European artillery. As also in the case of the Pennsylvania fort, the guns do not appear to have been regularly manned (although they may have been intermittently by European allies).[40] The Susquehannocks eventually abandoned this fort as well, and were driven back to Pennsylvania.

Sokoki

Northern New England in the Connecticut River Valley also witnessed the transition of Native fortresses. Western Abenaki or Sokoki, at what is now Hinsdale, New Hampshire, constructed a hybrid between the older-hilltop-circular forts and the geometric forts hidden in more inaccessible terrain. On a hun-

37 H. Frank Eshleman, "*Lancaster County Indians: An Exhaustive and Interesting Series of Historical Papers* etc." (Lititz, PA: Express Printing, 1908), 37, https://www.seekingmyroots.com/members/files/H009927.pdf, accessed 10 February 2026.

38 Eshleman, "*Lancaster County Indians*," 69.

39 Eshleman, "*Lancaster County Indians*," 122.

40 Lee, *Cutting-Off Way*, 145.

dred-foot hilltop overlooking the Ashuelot River, a tributary entering the Connecticut River at Hinsdale, the Abenaki constructed a fortress corresponding to musket ranges. The elements of the fort included multiple ditches and probably other earthen works.[41] Both the Dutch of the Hudson River Valley and the French in Canada supplied firearms to the Western Abenaki, enabling the Native group to combat the Mohawks, who had enjoyed musket-fire supremacy over many other Indians. In one raid in the early-1660s, the Abenaki repulsed hundreds of Iroquois warriors from the well-protected Hinsdale fortress.[42]

As with Native fortresses in other regions, the Abenaki also appear to have employed a defensive concept of a larger fort complemented by a smaller or satellite fort. Archaeologists have located an additional fort within supporting distance, upriver from Fort Hill. It remains unclear, however, what role this other fortress played, if any, during the Mohawk attack on Western Abenaki. The fort may not have been exactly contemporaneous to Fort Hill, but archaeologists placed it in the same epoch,[43] and it was possibly a satellite fort.

Pequotia Revisited

A similar military adaptation occurred in southern New England after the Mystic massacre. The remaining Pequots shifted their previously exposed fortresses to inaccessible cedar swamps. Instead of continuing to build easily observable circular fortresses, the Pequots also transitioned to the smaller-European-style fortresses. The Pequots' Mohantic Fort, on the present-day Mashantucket Reservation in Ledyard, Connecticut, serves an interesting transition example. The Indians located it on a low-ranging hillock surrounded by swampland. The Pequots developed geometric fortifications meant to ward-off Indian aggressors bearing firearms. Mohantic's walls measured roughly 55 yards or the effective range of flintlocks from bastion to bastion on the corners. These geometric fortresses also protected important Native group resources, in this case, an Indian blacksmith's forge. This forge allowed the Pequots to repair

41 Duncan Mathewson III, "Western Abenaki of the Upper CT River Basin: Preliminary Notes on Native American Pre-Contact Culture in Northern New England" *The Journal of Vermont Archaeology*, Vol .12 (2011), 26.

42 Silverman, *Thundersticks*, 44.

43 Mathewson, "Western Abenaki," 28.

Wie sie deß Nachts jrer Feinde Stätte anzünden. XXXI.

DJe Feinde/ so sich an jhnen zu rechen begeren/kommen bißweilen bey nächtlicher weile/so stillschweigend / als es jnen jmmer müglich ist/ zu erspähen/ ob die Wacht durch den Schlaaff vberfallen sey/oder nicht. Wann sie dann vermercken/ daß sich die Hüter nicht regen / so zünden sie den hindersten Platz der Statt an/ vnnd binden nach jhrer weise / dürr Moß von den Bäumen/ zubereytet/an die Spitzen der Pfeile/ zündens an/ vnd schiessen also das Feuwer mit dem Pfeil in die Statt/ daß sie die Dächer/von Palmenzweygen bedeckt/vnd von der Sonnen Hitz außgetrücknet/anstecken. Wann sie nun sehen/daß die Dächer brennen/ lauffen sie auffs allerschnelleste darvon/ ehe dann es die Feinde gewahr werden/ dann sie können gar geschwind lauffen/daß sie schwerlich zu erhaschen sind. Vber das gibt der Brandt den Jnnwohnern gnug zu thun/sich von dem Feuwer zu erretten. Dises sind also die Kriegßbossen/ deren sich die Jndianer zugebrauchen pflegen / jhrer Feinde Stätt zuverstören. Es ist wol war/ daß jhr er einer dem andern dardurch keinen grossen Schaden thut/ angesehen/ daß sie es anders nichts kostet / denn nur die Arbeyt/ neuwe Häuser widervmb zu erbauwen.

their own muskets and fashion gun flints.[44] The only thing that Native blacksmiths could not undertake was manufacturing gunpowder.

Like the other Native American fortresses that were transitioned during this period into geometric fortresses along tell-tale lines, Mohantic's security ultimately rested on its alliance with Connecticut Colony. As was the case with the Narragansetts' Great Swamp fortress, the English, with Indian allies, could employ means to capture the best of Indian fortresses. Thus, even with Mohantic's updated design, the new alliance with the colonists was the Pequots' ultimate weapon.[45]

A fortress of like design was located within a mile of Mohantic. Archaeology revealed a similar debris field to that found at Mohantic, indicating a fort.[46] Little is known about this second citadel, however, as it has never been excavated. A few miles away, the "eastern" Pequots maintained another mini-geometric fortress on a similar low-rise flanked by the Mystic River on one side and difficult terrain surrounding the other flanks.[47] The eastern Pequots, who were members of the original larger group prior to 1637, resettled in their traditional homeland in subsequent years.

Mohegandom

The Mohegans, enemies of the closely related and intermarried Pequots during the Pequot War, but then their allies in 1675, reconfigured their main fortification at Fort Shantok, not far from Mohantic. This reconfiguration included a stone building, probably a blockhouse. Archaeology reveals clear linear features as well.[48] Newly developed patronage of the English also served as even a more important buffer against hostile Native groups.

Fort Shantok stood strongly against potent coalitions of Narragansetts, middle-Connecticut River Indians, and Iroquois. Uncas, the famous Mohegan sa-

44 Mcbride, "Mohantic," 322-326.

45 Warren, *Connecticut Unscathed*, 78-95.

46 Author interview with McBride, December 2025, also McBride, "Mohantic," 324.

47 Warren, *Connecticut Unscathed*, map 119.

48 Bert Salwen, "European Trade Goods and the Chronology of the Fort Shantok Site," in *Native Forts*, 287.

chem,[49] used his excellent standing with the Connecticut colonists, and particularly the Major John Mason (the Captain Mason from Pequot War) family, to advance his Native group's interests and solidify the critical alliance with Connecticut, that like with the Pequots after 1637, meant survival. This influence often came at the expense of peaceful relations with other nearby Native groups. For instance, the Narragansetts never forgave Uncas the slaying of their grand sachem (chief), Miantonomo. This killing, tacitly approved by Connecticut authorities, led to decades of intermittent warfare between Uncas and the aforementioned groups. The construction of the stone building during this time inside Fort Shantok, indicated that it was for defense against the increased threat from adversary Native groups, emanating from Uncas's enviable relationship with the Connecticut colonists.

Indeed, Shantok was besieged multiple times, and in a number of instances, Connecticut colonists came indirectly to the rescue of Uncas. In one case, the colonists were able to resupply Shantok over the Thames River's bluff below the fortress. On another, armed colonists deployed into the fort. On nearly every occasion, the adversary's siege was broken, and a wider war between the English and Indians was also avoided during these years. The singular time Uncas was driven from Shantok, he successfully sought shelter at the fort of the closely-related, and nearby, Western Niantics. The Narragansetts and River Indians for their part, remembered these incidents, contributing to the outbreak of the Great Narragansett War in 1675.[50]

Fort Shantok, like Mohantic and Great Swamp, also had multiple supporting fortresses, and a smaller satellite fortress. The smaller, satellite palisaded structure was referred to as "little Mohegan fort" or "Trading Cove Fort," named for a creek that ran into the Thames River to the north of Shantock's high bluffs. Another citadel belonged to Mohegan sachem Wawequa, Uncas's brother, and was five miles distant, now within the bounds of Norwich, Connecticut. Yet another fort, which nineteenth-century authors considered more ancient than the previ-

49 This was not the "Mohican" or Mahican sachem whom famed American author James Fenimore Cooper confused in *Last of the Mohicans* with the actual Uncas of the Mohegans, who inhabited Shantok.

50 Warren, *Connecticut Unscathed*, 29, 32-33, 36.

ously noted, stood not far away on the Yantic River.[51] This again demonstrated, that even in the case of a formidable fortress like Shantock, the defense of the forts rested on the ability to relieve each other, as necessary. Multiple citadels also posed obstacles for assailants and threatened lines of communication. The Mohegan defensive system thus boasted not only a satellite fortress in proximity of a main bastion, but also a density of mutually-supporting structures.

Eastern Iroquoia

The Mohegans' hated enemy, the Mohawks or "keepers of the eastern door" of the Iroquois Confederacy, also employed a system of defense similar to other eastern Native groups of the post-contact era. The French invasion of Mohawk territory in 1693 during King William's War revealed that the Native group also employed the system of a larger fort complemented with satellite fort. The French in fact called the structure "Mohawk little fort."[52] Facing French regulars as they had in a similar invasion in 1663, the Mohawks did not fight from their fortresses, opting instead to preserve population in the strategy that Lee calls "flee."[53] Jon Parmenter describes the centrality of mobility for not only military purposes, but to the Iroquois's very conception of their culture. Yet fleeing had its limitations, as noncombatants could not move as quickly as warriors, and food caches could not be hauled readily to new locations. Although the French destroyed both forts, the Mohawk population survived, and also counterattacked the French, freeing their prisoners during the French march back to Canada.[54]

Besides these two Mohawk fortresses which were prominent during this particular French invasion, there were other Mohawk fortresses along the Mohawk

51 F.M. Caulkins, *History of Norwich Connecticut: From its Settlement in 1660 to January 1845* (Norwich, CT: Thomas Robinson, 1845), claims that Wawequa's fort was a lookout for the stronger Fort Shantok, 15, and also references "Uncas's strongest fort," 23, indicating more than one Mohegan fort existed in Mohegan territory. Caulkins referenced Wawequa's fort as five miles distant, 15; Duane H. Hurd, *History of New London County, Connecticut: With Biological Sketches of Its Pioneers and Prominent Men* (Philadelphia: J. W. Lewis and Co., 1882), 250.

52 Parmenter, *Edge of the Woods,* 224.

53 Lee, *Cutting-Off Way*, 150, describes "flee" also as "operational mobility."

54 Parmenter, *Edge of the Woods*, Preface, 225.

River, as well as "village clusters."[55] The Native group thus boasted a density of defenses similar to the contemporaneous Mohegans and Pequots. The Mohawks, too, benefited from their alliances with the other members of the Iroquois Confederacy, and from the Dutch and then the English. This further demonstrated that Native fortifications could be successful, especially when backed-up by alliances. The Mohawks still achieved the goal of protecting their population from this French incursion, even though they lost two forts.

Narragansett Country

The Narragansetts lacked critical colonial support in 1675 that the Mohegan and Mohawks maintained. The lack of a viable alliance resulted in the Native group's serious defeat at Great Swamp. Although somewhat supported by Quaker pacifists, the Narragansetts' relationship offered scant protection from the militant Puritans, who maintained military power in New England.[56] The Narragansetts were the most numerous Native group in southern New England by 1675, but employed a dense fortress pattern meant to offset the diplomatic disadvantage. Each fortification enjoyed support from another bastion. There were five known Narragansett fortifications, but with a population of 5,000 there were likely more, as well as at least two additional forts from the closely related and nearby Eastern Niantic Native group.[57]

The Narragansetts located many of these fortifications in the recesses of deep morasses, such as the colonists confronted at Great Swamp. There were reports that Narragansetts from an adjoining swamp joined the fight on that fateful day of 19 December 1675, indicating a hidden bastion within supporting range of the larger fortification. This was likely what was called Pessicus's fort, and was only about three miles from Great Swamp Fort on the other side of Worden Pond. Three miles from Pessicus's fort in a north-northeasterly direction was

55 Lee, *Cutting-Off Way*, 7-10.

56 James A. Warren, *God, War, and Providence: The Epic Struggle of Roger Williams and the Narragansett Indians against the Puritans of New England* (New York: Scribner, 2018), argues that Roger Williams and his colonial dissenters allied with the Narragansetts, attempting to thwart Puritan aggression between the Pequot and Great Narragansett Wars. This alliance failed in 1675.

57 Warren, *Connecticut Unscathed*, 31, 39, 134-135.

"Stony Fort." This citadel was reportedly built by "Stonewall John," the same Indian stone-mason who directed the building of the defenses at Great Swamp.[58]

Six miles to the northeast of Stony Fort was Old Queen's fort, which the colonial troops had raided prior to their attack on Great Swamp. Nineteenth-century historian Henry Hammond sketched the outline of Queen's Fort in 1865, and it was clearly a mini-European-style fort. As at Great Swamp, it maintained a geometric pattern, including bastions.[59] In an interesting assertion, Lisa Brooks claims there was a protected underground cavern within Queen's Fort that sheltered the Queen's followers during the colonial foray.[60] Narragansett sachem Pomham also had a fort near Warwick, Rhode Island, further to the north,[61] and given the pattern of satellite fortresses, likely others near that location. The Narragansetts were so effective at hiding their fortresses, scholars are unlikely to ever know the true extent of their fortification system. The three miles between multiple fortresses around Great Swamp, however, confirms both that the Narragansetts employed a density of fortifications and satellite forts. Pessiscus's fort abides the small, satellite fort pattern supporting Great Swamp Fort, as well as Stony Fort in support of Pessicus's citadel or vice versa.

At Great Swamp itself, the Narragansetts had constructed their fortress with abatis, or felled trees and uprooted bushes all around the perimeter. As a second-line of defense to the abatis, a ditch or moat, with at least some of it filled

58 Ann Holst "Indian Forts in Early Rhode Island" in *Online Review of Rhode Island History* http://smallstatebighistory.com/indian-forts-in-early-rhode-island/#:~:text=The%20best%20known%20is%20Canonchet,of%20European%20military%20fort%20construction accessed 24 January 2026.

59 Winthrop Journal, Henry Hammond et al., in Holst "Indian Forts in Early Rhode Island." While an extremely useful compilation of the Narragansett forts, Holst repeats a misleading claim that the Great Swamp Fort is not where the monument is located. Warren, *God, War, and* Providence, 1, repeats this error. McBride's archaeological dig beyond a doubt confirmed the burned remains of wigwams and a led field where some of the battle took place ~100 yards north of the Great Swamp Monument. Included in this find were multiple English and Indians objects, as well as many spent musket balls and the remains of a cartridge bag with musket balls intact, that had partially burned in the fire.

60 Lisa Brooks, *Our Beloved Kin: A New History of King Philip's War* (New Haven: CT, Yale University Press, 2018), 240.

61 Julie A. Fisher and David J. Silverman, *Ninigret, Sachem of the Niantics and Narragansetts: Diplomacy, War, and the Balance of Power in Seventeenth-Century New England and Indian Country* (Ithaca, NY: Cornell University Press, 2014), 101.

with swamp water, also encompassed the fortification. The fortification itself consisted of the ubiquitous palisade log stockade of the pre-contact epoch, but instead of deploying these in a circular pattern, these were now constructed along the same pattern as at the Pequot's updated fort at Mohantic. A contemporary minister, William Hubbard, related that there were blockhouses and flankers guarding the few approaches to the fort, if attacking forces were even able to negotiate the first two defensive belts.

Testimony to the strength of the Narragansett defense was how the battle unfolded. First the colonists received harassing fire in the swamp itself, then began taking more devastating musketry as the column approached the fort. The first entrance that the colonists stumbled upon was so well guarded, that the colonists bypassed it, while under fire. The van led by the Massachusetts Bay companies then assaulted across a tree bisecting the palisades at another portion of the fortress. Though they received heavy casualties from the Narragansett blockhouse guarding this approach, the colonists pressed on into the interior.

There, the Narragansetts regrouped and drove the Massachusetts men back over the log.[62] This is when, as described above, part of the Connecticut contingent, which had formed the rear-guard of the colonial army, navigated to another, undefended portion of the Narragansetts' fortress, and slipped through the more widely spaced palisades in that sector. Harnessing enough combat power in the interior, Connecticut attacked across the fort, assailing the Narragansetts in the rear. Surprised by the sudden fire from their rear quarter, the Narragansetts attempted to thwart the Connecticut sally, while keeping the Massachusetts' troops pinned down to their front.[63] A Massachusetts leader, noticing that the Narragansetts had recoiled to blunt the Connecticut assault, yelled "they run," and remounted the log, leading his men into the interior.[64]

As the fight moved to the center of the fort, the Narragansetts rallied and fired volleys as they received them from the English, while also using the grain caches in their wigwams for cover. Eventually the Narragansetts fled the fort into the interminable swamp, likely for want of ammunition, when the Mohe-

62 Hubbard, *The Indian Wars*, 105-107.

63 Trumbull, 339, 341.

64 Hubbard, *Indian Wars*, 107.

gans and Pequots killed many of them. The colonial army then set fire to the fortress, with many noncombatants immolated, still hiding in their wigwams. This was the bloodiest battle of the war for Connecticut, and the entire army lost over a third of its original force, killed and wounded. The Narragansetts suffered hundreds of noncombatant deaths, but not many warriors were killed.[65] Although the Narragansetts and their allies ultimately lost the war, it was not due to a lack of effective military adaptation. Defeat was a failure to cultivate competent European allies to relieve their fortresses or to deter the Puritans.

The English always had to employ Indian scouts, such as at Great Swamp, to locate the fortresses in the foreboding terrain.[66] As Indian populations moved away from advancing colonists, the remains of these forts, especially in inaccessible areas, were many times lost to history. The sparse surviving accounts of the early colonial world make the search for these fortifications extremely difficult, if not impossible, but enough is known about the Narragansetts and Pequots to conclude that their bastions were formidable and concentrated.

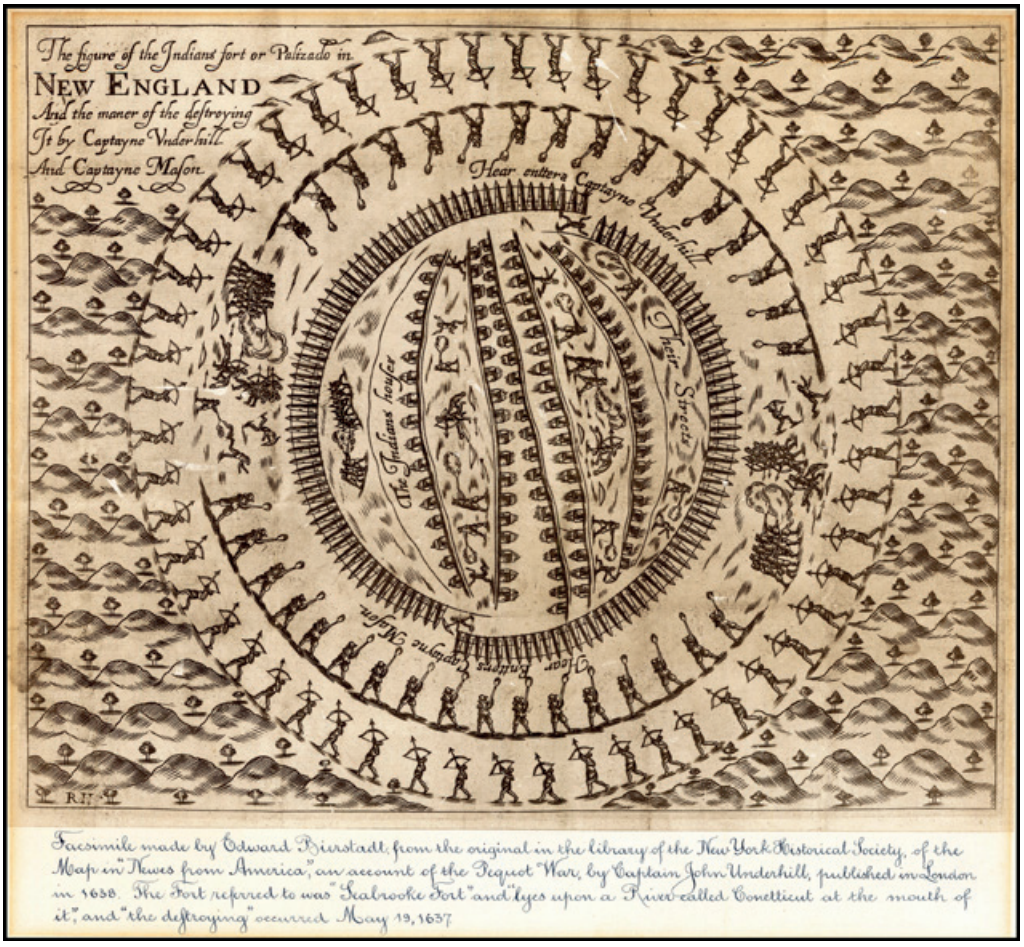
The nearby Eastern Niantics had at least one large geometric fortress at what is now Charlestown, Rhode Island. This served as the main village for their head sachem, Ninigret. The Charlestown fort maintained multiple bastions and ditches, as well as some stone facing.[67] Although English colonists viewed Ninigret with suspicion during the Dutch wars, the sachem managed to remain neutral then and during the Great Narragansett War. This showcased the importance of alliances or at least diplomatic neutrality, instead of gambling on military prowess, as the Narragansetts did, without belligerent European allies. Although a contingent of Eastern Niantics accompanied the colonists at Great Swamp, they reportedly aimed high on purpose to avoid shooting the closely related Narragansetts.[68]

65 Warren, *Connecticut Unscathed*, 217n55, 188n12.

66 Hubbard, *The Indian Wars*, 105.

67 Christine N. Reiser, "Safeguarding the 'Mint': Wampum Production and the Social Uses of Space at Fort Island," *Native Forts*, 277.

68 Warren, *Connecticut Unscathed*, 165.


The figure of the Indians fort or Palizado in
NEW ENGLAND
And the maner of the destroying
Of it by Captayne Vnderhill
And Captayne Mason.
Their entera Captayne Vnderhill
Their Streets
The Indians howses
Their entera Captayne Mason
RH
Facsimile made by Edward Bierstadt from the original in the library of the New York Historical Society, of the Map in "Newes from America," an account of the Pequot War, by Captain John Underhill, published in London in 1638. The fort referred to was "Seabrooke Fort" and lyes upon a River called Conetticut at the mouth of it," and "the destroying" occurred May 19, 1637

Engraving depicting the attack on the Pequot fort at Mystic, from John Underhill *Newes from America*, London, 1638 Wikimedia Commons

Long Island Natives

The Indians of eastern Long Island, who were more closely related to the Indians of southern New England than the Delaware Native groups of western Long Island, also constructed a series of geometric fortresses meant to exploit the firepower of muskets. These Indians were alternately harassed by Pequots, Eastern Niantics, and then the Narragansetts. For a time between the Pequot and Great Narragansett Wars, many Native eastern Long Islanders were under the

dominion of Ninigret.[69] Native forts excavated at Forts Corchaug and Montauk both boasted elements of small-European-fortress design from the post-contact era. In the case of Corchaug, there was a satellite fort within supporting distance, as has been the pattern with the Pequots, Mohegans, Narragansetts, Mohawks, and possibly, the Western Abenaki.[70] Further to the west, a Delaware group, the Massapeag appear to have adopted their fortress after their kin were destroyed at Pound Ridge, New York, on the mainland. Interestingly, Underhill may have attacked this group also like he did the northern Delaware at Pound Ridge.[71] Perhaps, the redesigned fortress was a response to Underhill's incursion there around the time of Kieft's War.

Conclusion

The success of Native fortifications, as was the case also in Europe and elsewhere, often rested on the ability for the besieged to gain succor from nearby kin or allies. This was the difference between success and failure that has been overlooked by historians. As with Uncas at Fort Shantok, when Iroquois and adversary southern New England Algonquin Native groups repeatedly besieged his Mohegan Native group stronghold, his alliance with the English of Connecticut proved the decisive factor. It was thus the strength of the alliance which witnessed providing logistical replenishment and in one case, English militia, that was the determining factor in his success. The Narragansetts at Great Swamp lacked a competent English ally, and even though the Narragansetts' dense fortification network provided reinforcements, the size and firepower of the colonial army proved the difference in December, 1675. The Pequots too, relied on English allies after 1637, and there is evidence of English presence at Mohantic, perhaps as guards for Pequot non-combatants,[72] as the Pequot warriors were marauding in support of the colonist war effort inside Narragansett country.

Sometimes a fortress was able to ward-off an attack without assistance. The Sokoki stronghold at Fort Hill survived, when the attacking Iroquois lost so

69 Fisher and Silverman, *Ninigret, Sachem of the Niantics and Narragansetts*, 44-45, 52-53.
70 Solecki, "Native Forts of the Mid-Seventeenth Century," 3.
71 Solecki, "The Archaeology of Fort Neck and Vicinity," in *Native Forts*, 145.
72 McBride, "Mohantic Fort," 329.

many warriors, reportedly 100, that they had to abandon the siege. A combination of factors, however, led to Sokoki victory, namely, the unusual natural strength of the position, the competent defense of Natives similarly armed with flintlocks, and the Iroquois's inability to replenish casualties in enemy territory. The Sokoki, however, did rely on their French alliance for armaments. The same held true at the Susquehannock forts, which held out, at least temporarily, against both the Seneca and English without supporting efforts; although there too, Europeans sometimes provided at least material aid and built the original citadel.

These examples demonstrate that unlike the immediate-contact era of more readily observed—and hence vulnerable—circular palisades, as Mystic exemplified, or a strong natural position with less or no outworks, as at Pound Ridge, geometric-musket fortifications stood more of a chance of survival or at least holding-out long enough for non-combatants to escape. These odds were improved greatly with the assistance of nearby kin from adjoining, satellite forts. The forts' updated construction, as well as the close location of other forts, were critical factors for survival.

It is less clear that abandoning forts for more operational mobility, but less protection for non-combatants and necessary foodstuffs, was a better Indian coping strategy for the firearms' era of Native America. "Fleeing" worked temporarily for the Mohawks against the French raid, but unlike in English colonial areas, the French were far from their colonial settlements, and could not hold ground taken from the Indians. Given the absence of written records for Native America, as well as the hidden-nature of these musket-fortresses, it is very likely that many more Native against Native engagements, and even battles with European involvement, occurred in North America, and simply no records remain extant. For instance, little is known about the so-called Battle of the Northeast between Pequots and Narragansetts in 1637.

The existence of geometric Indian fortresses in the seventeenth-century Eastern Woodlands of America demonstrated a clever adaptation to European technology. This led to near disaster for the Europeans, as the colonists struggled to respond to these effective changes, such as exemplified by the large number of colonial casualties at Great Swamp, the inability of the English to attack Susquehannock fortifications, and the failure of the French to do extensive dam-

age to Iroquoia. Indian groups attacking these new citadels also often failed as did the Narragansett coalition against Uncas's Shantok, the Senecas for a period against the original Susquehannock fort, and the Iroquois against the Western Abenaki's Fort Hill. Although the colonists ultimately survived the Mystic expedition and the Great Swamp Fight (but only with a disabled army), as well as the Great Narragansett War itself; the Susquehannocks were eventually defeated during Bacon's Rebellion; and the fledgling American colonies undermined the Six Nation Confederacy; Native forts rendered the defenders temporarily successful, and ultimate defeat was a near-run episode.

The successes of Native fortresses, based on density of these fortifications as satellites to each other, and anchored upon alliances with other Indians and Europeans, did not spare Indian populations casualties and ultimately many fled westward or assimilated into colonial and then United States and Canadian societies (if at the margins) or were ultimately forced onto reservations. The Indian defensive system of fortifications from the mid-seventeenth century, however, temporarily prolonged Indian sovereignty, and often meant at least the survival of the Native group.

Forteresses for Defending Río de la Plata in the Eighteenth Century

by Alejandro Amendolara[1]

Introduction

The conquest of the *Río de la Plata* —the name then given to the region that today comprises parts of Argentina, Paraguay and Uruguay— began in 1516 by the Spaniard Juan Díaz de Solís who, in his attempt to find a passage from the Atlantic Ocean to the Pacific Ocean and reach the Eastern Indias, ventured into a vast estuary which he believed to be the long-sought passage, naming it *Mar Dulce* (later *Río de la Plata*), in reference to the water's low salinity.

With the discovery of territories in the *Nuevo Mundo [*the *New World]* and the need to agree on their distribution, the Catholic Monarchs of Spain and King João II of Portugal signed the Treaty of Tordesillas on 7 June 1494, establishing a demarcation line from pole to pole 370 leagues west of the Cape Verde Islands. This division line assigned the lands to the west to Spain and those to the east to Portugal, allowing the latter to secure Brazil.

Given the imprecisions of the treaty and the measurement methods of the time, the Portuguese considered that the line should extend west of the meridian established by the Spanish and, in this regard, they tended to include the entire Banda Oriental within their claim. There were significant differences between the two crowns regarding the point of measurement for the line in the Treaty of Tordesillas, this being the main argument for the Portuguese to constantly advance westwards into South America beyond the Spanish border.

The first founding of Buenos Aires in 1536 was driven by political and mili-

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tary considerations. The intention was to occupy the *Río de la Plata* and prevent the Portuguese from travelling upriver towards the mines of Upper Peru, which lay on the other side of the Chaco, north of the 25th parallel—the furthest point explored by Juan Caboto.[2]

The second founding of Buenos Aires by Juan de Garay on 11 June 1580 arose from a commercial need that began to be felt shortly after its depopulation, and on which the settlers and officials, from Paraguay as well as Tucumán and Upper Peru, repeatedly pressed the King of Spain.[3]

When the colonization of the lands of the *Río de la Plata* began, making use of the regulations [*Ordenanzas*] in force in Spain since 1570 regarding the militia, a decree was issued ordering the residents to come with their slaves and other laborers, one day each week, to reinforce the walls erected for the use of the artillery at the Royal Fort of San Baltasar de Austria.[4]

The *Government of the Río de la Plata*, which belonged to the vast Viceroyalty of Peru and lay to the west of the meridian established by the Treaty of Tordesillas, formed the southern Spanish border with Portuguese Brazil. It was established by King Felipe III of Spain on 16 December 1617, as a measure to separate it from the Governorate of Guairá or Paraguay, and formed part of the Viceroyalty of Peru until 1776, at which point it became part of the *Viceroyalty of the Río de la Plata*, first established provisionally on 1 August 1776 and then permanently on 27 October 1777, by order of King Carlos III, who established its capital in the city of Buenos Aires.

The vast area covered by the Viceroyalty of Peru and the growing importance of Buenos Aires as a commercial center made the tasks of government difficult, was a major reason for the division of its territory.

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2 De Gandía, Enrique; "La Segunda Fundación de Buenos Aires"; in Academia Nacional de la Historia; *Historia de la Nación Argentina (desde los orígenes hasta la organización definitiva en 1862), Vol.III*, Editorial El Ateneo, Buenos Aires, 1940, p. 205.

3 De Gandía; *La Segunda Fundación*…, p.205

4 Beverina, Juan (coronel); *El Virreinato de las Provincias del Río de la Plata. Su Organización Militar; Reedición en Homenaje al 5to. Centenario del Descubrimiento de América*; Biblioteca del Oficial; Círculo Militar, Buenos Aires, 1992. p.79

The Defence of the Río de la Plata

Defence in the *Río de la Plata* was characterized by the need to respond simultaneously to different challenges: on the one hand, the defense of coastal settlements against the threat of pirates and privateers from potential foreign powers such as England, France and the Netherlands; on the other, the defense of the border against the Portuguese (who organized the famous *bandeiras* that raided Spanish towns and settlements, stealing, destroying, killing and capturing peaceful indigenous people, particularly the *Guaraní*, who were their main victims, as they were enslaved and sent to São Paulo, where they were sold to the settlers of the sugar plantations in the Captaincy of São Vicente), which took on a new profile and became a priority from the time of Colonia del Sacramento in 1680.[5]

The militias of Buenos Aires were organized from the very outset of the conquest to secure and complete it in defense against the indigenous peoples during the sixteenth century, and later, to successively confront the threat posed by privateers and the Dutch, Portuguese and English.[6]

The arrival of John Drake made the locals realize that without a fort to defend the town, they were all in grave danger. On 12 October 1585, the treasurer Hernando de Montalvo wrote to the King asking him to have a fort built of stones, bricks and limes, capable of withstanding artillery, because earthen walls were only suitable for the Indians; but the fort did not become a reality until Governor Hernando de Zárate arrived in Buenos Aires.[7]

Once the extent of the *New World* was known, and in accordance with the provisions of the Treaty of Tordesillas, Spain considered that the demarcation line crossed the continent from the 1st parallel south to the 24th, meaning that the northern part crossed approximately at the level of Pará and in the south at the port of San Vicente. For its part, Portugal considered, as was later set

5 Birlo, Pablo y Birolo, Pablo, *Militarización y Política en el Río de la Plata colonial – Cevallos y las campañas militares contra los portugueses, 1756-1778*, Prometeo Libros, Buenos Aires, 2015, p.31.

6 Beverina, *El Virreinato …*, p.79.

7 De Gandía, Enrique, "Los Piratas en el Río de la Plata", In: Academia Nacional de la Historia, *Historia de la Nación Argentina (desde los orígenes hasta la organización definitiva en 1862),* Vol.III, Editorial El Ateneo, Buenos Aires, 1940, p.235.

out by its plenipotentiaries at the meetings held in Badajoz in 1681, that the famous demarcation line extended southwards to the mouth of the River Plate, a long-standing aspiration of the Portuguese nation, which has its roots in part in the expedition organized in 1530, under the command of Martim Alfonso de Sousa, with the aim of asserting Portuguese sovereignty over the eastern coast of the estuary. [8]

In 1680, in breach of the Treaty of Tordesillas, the Portuguese founded Colonia del Sacramento on the eastern bank of the river, opposite Buenos Aires. Colonia was the subject of disputes between the Spanish and the Portuguese for nearly a century, changing hands several times and forcing the Spanish to colonize the *Banda Oriental*, which had until then been largely ignored. Colonia was captured by Spanish forces in the same year it was founded, only to be returned to Portugal in 1681. To halt the Portuguese advance, the Spanish King Felipe V ordered the construction of Montevideo and its fortifications on the eastern bank of the river. This work was carried out between 1724 and 1730.

European conflicts exerted a notable influence on the *Río de la Plata*, reflected in the numerous pacts and treaties concluded by the Spanish crown with other powers, mainly Portugal, England and France.

The rivalry between Portugal and Spain became more pronounced when the wave of colonization began in the Americas, which were then known as the *'Indias'*. The controversial Treaty of Tordesillas and certain papal bulls were prompted by the disputes between the two crowns over dominion of *'the Ocean Sea'*. The treaty aimed to demarcate the boundaries of the conquered territories.

Among the factors that most disrupted viceregal life in the *Río de la Plata*, mention should be made of the expansionist drive displayed by the neighboring Portuguese possessions, which by then had made inroads into Paraguay, Río Grande, Mojos and Chiquitos, and the repeated conflicts over the possession of Colonia del Sacramento, which was considered *"key"* to attempting to dominate the *Río de la Plata* estuary.[9]

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8 Torre Revello, José; "La Colonia del Sacramento", In: Academia Nacional de la Historia, *Historia de la Nación Argentina (desde los orígenes hasta la organización definitiva en 1862),* Vol.III, Editorial El Ateneo, Buenos Aires, 1940, p.380.

9 Comando en Jefe del Ejército, *Reseña Histórica y Orgánica del Ejército Argentino,* Tomo I, Círculo Militar, Volumen 631-632, Buenos Aires, 1971, p.29.

England found in the Portuguese a potential ally with whom to attempt a continental penetration, which would bring relief to its dire economic situation. The occupation of the Malvinas Islands represented another attempt aimed at undermining Spanish power in this part of the *New World*.

This situation, which was becoming increasingly threatening, forced the Spanish to make enormous efforts to defend certain vulnerable points and secure the sea routes to Spain.

It was also necessary to adopt fortification measures to ensure the integrity of the vast territories of the River Plate, particularly the ports of Buenos Aires and Montevideo, which were the main ports in these latitudes and the accessible points along the extensive maritime and riverine coastline.

Special Geographical Situation

The particular geographical location of Buenos Aires and Montevideo, the importance of the *Río de la Plata* estuary as a gateway to the interior of the continent, with the extent of its maritime and riverine coasts -easily accessible to an enemy expedition seeking to land there- created a state of almost permanent international political tension in which Spain found itself, along with the frequent wars in which it was involved, with possible negative consequences for the preservation of its dominions in the *Río de la Plata*.

The fact of bordering a neighbor that pursued to advance upon Spanish territories, coupled with the scanty support Spain provided in terms of resources, soldiers and military supplies, and the impossibility of doing so swiftly in the event of an imminent conflict or a war already declared, were factors that compelled the local authorities of the *Río de la Plata* to seek to enhance the value of their meagre defensive resources by utilizing and reinforcing, as far as available resources permitted, the vital points of the territory, whether on the river and sea coasts or along the land borders.

As Spain had imposed strict controls on commercial activity in its colonies in the *Río de la Plata*, maritime trade routes were mainly linked to ports on the Iberian Peninsula.

From 1573, Spain had established a maritime route for trade, implemented through the commercial monopoly with the viceroyalties, officially known as

the *Galleon Route [la Ruta del Galeón]*. Shipments of silver, gold, emeralds, pearls and other goods leaving the Viceroyalty of Peru travelled from the port of Callao in the Pacific Ocean to the city of Panama. From there, the cargoes and treasures were transported overland to Portobelo, and from that port fleets of galleons sailed across the Caribbean Sea, before crossing the Atlantic Ocean to the port of Seville, the only port authorized for loading and unloading until 1765. In the opposite direction, goods from Spain arrived through Panamá by sea at Callao and from there could be transported by mule to Potosí, from where they continued by land to Buenos Aires.

On 21 November 1739, British forces captured and destroyed Portobelo, which demonstrated to the Spanish authorities the need to open a safer route. The *Río de la Plata* was the main alternative to the *Galleon Route*, which made it vulnerable to enemy attacks and necessitated a strengthening of the Spanish presence in the area.

Until the end of the eighteenth century, all overseas communications were routed through the port of Montevideo, making use of the existing naval station. This was the only deep-water, sheltered port that enabled trade with Spain. From there, passengers, mail, troop contingents and goods from Europe bound for Buenos Aires and the interior of the viceroyalty were transferred to smaller vessels to make the journey to the capital's landing stage, which was usually undertaken by cart due to the insufficient depth.[10]

Towards the end of the eighteenth century, the port of Ensenada de Barragán was opened, from where the link with Buenos Aires was provided by a secondary dirt track some 60 kilometers long.[11]

The scarcity of economic resources prevented the construction of defensive structures robust enough to fulfil their purpose. To erect them, makeshift methods and local resources were employed, in the belief that the necessary funds and military reinforcements would arrive too late in the event of a conflict. Such precautions were sensible given the distance from the metropolis; the wars in which it was engaged in Europe; and its rigid dependence on the government in Lima for the necessary resources. The fact is that security and defense were

10 Comando en Jefe del Ejército; *Reseña Histórica* …, p.60.

11 Comando en Jefe del Ejército; *Reseña Histórica* …, p.61.

Fig. 1.Map of the *Río de la Plata* – 1757. Bellin, Jacques Nicholas 1703–72. Published in Antoine François Prevost's 15-volume *Histoire Générale des Voyages, written by Prevost and other authors between 1746 and 1790*.

also subject to bureaucratic procedures, therefore, the creation of the viceroyalty sought to remedy this situation.[12]

Thus, the art of fortification in the *Río de la Plata* was of great importance and saw widespread application, and whilst works of this kind did not stand out for their intrinsic technical merit – the scarcity of resources could never be remedied – their number and the special characteristics of some of them, on the other hand, demonstrate the authorities' constant concern for this matter, and their ability to make use of local materials for their construction, adjusting them, moreover, each time to the specific purposes of their use.

12 Comando en Jefe del Ejército; *Reseña Histórica* …, p.30.

Effects of European Diplomacy on the Río de la Plata

It would be far too lengthy to list all the agreements and treaties concluded by the Spanish Crown during such a turbulent period, as well as to analyze the influence each of them had in relation to the organization of military forces in the *Río de la Plata*. What is evident is that the situation in Europe had a profound impact, introducing comprehensive reforms in the political and military organization of the colony.

The Treaty of Madrid, a document signed by Fernando VI of Spain and João V of Portugal on 13 January 1750 to define the boundaries between their respective territories in South America, annulled the Treaty of Tordesillas and any other supplementary treaties. By abolishing the line of the Treaty of Tordesillas, affected the governorship within the boundaries of the Banda Oriental, incorporating the Colonia del Sacramento into its territory (it was not ceded by Portugal) and losing the Eastern Jesuitic Missions (occupied by Portugal in May 1756).

There were difficulties faced throughout the 1750s in achieving a demarcation of Portuguese and Spanish South American possessions in a vast and inhospitable area; the so-called Guarani War, which consisted of the resistance by the indigenous peoples and Jesuits of the seven towns of the Eastern Jesuitic Missions of Uruguay to leave that place so that it could be handed over to Portugal; and the death, two years earlier, of the Spanish King Fernando VI, with the accession to the throne of Carlos III, who decided on a general review of the agreements made with the Portuguese.

However, in 1756, a new war broke out between the major European powers, known as the Seven Years' War. The Treaty of El Pardo was signed on 12 February 1761, annulling the Treaty of Madrid, under which Spain was not required to hand over the Eastern Jesuitic Missions, whilst Portugal retained the Colony of Sacramento.

Spain, ruled by Carlos III, finally entered the war on the side of Louis XV's France in January 1762, bound by the Third Family Compact which united the two monarchs of the House of Bourbon. That same month, the frigate *Victoria* (26 guns), commanded by Lieutenant Carlos José de Sarriá, set sail from Cádiz with orders for Governor Pedro de Cevallos to besiege and capture Colonia del Sacramento.

The capture of Colonia and the repulsion of the enemy fleet was one of the greatest victories achieved up to that point in that part of the Americas. Cevallos continued his campaign eastwards, seizing the Fortress of Santa Teresa on 19 April 1763 and, a few days later, that of San Miguel, reaching Río Grande de San Pedro on 24 April, where he was forced to halt upon learning of the Treaty of Paris, signed on 10 February 1763, which brought the war to an end and under which Colonia del Sacramento and the other possessions occupied by Cevallos were to be returned to the Portuguese.

The Second Spanish Portuguese War was fought in 1776 and 1777, concluding with the Treaty of San Ildefonso, under which the Line of Tordesillas was definitively abandoned. On 1 October 1777, this treaty was signed between Spain and Portugal, which recognized Spanish sovereignty over Colonia del Sacramento and San Gabriel Island, but obliged Spain to definitively abandon the island of Santa Catalina and the territory of Río Grande, to the north of the Banda Oriental, which had been gradually occupied by Portugal and whose possession had been consolidated by the Treaty of Madrid of 1750. Spain also received the cession of the islands of Annobón and Fernando Poo in the Gulf of Guinea.

Fortifications in the Río de la Plata

The Fort of Buenos Aires

Initially confined to the city and port of Buenos Aires, the active life of the River Plate territories —since their separation from Paraguay led to the establishment of the Province of Buenos Aires (early eighteenth century)— saw its governors take steps to protect the city from a surprise attack. Raids were a regular occurrence: from the river by the Dutch from Brazil and by privateers, and from land by enemy troops landing in the vicinity of the town.

The makeshift defenses outlined when the second foundation of Buenos Aires was undertaken were gradually reinforced as the threat of danger forced the adoption of radical and even drastic measures. Thus, in 1636, Governor Don Pedro Esteban Dávila, alarmed by reports that the Dutch had seized ‘the main strongholds on the Brazilian coast’, issued a decree on 12 November ordering the residents to

> "report with their slaves and other laborers, one day each week, in proportion to the number each possessed, to reinforce the walls erected for the use of artillery at the Royal Fort of San Baltasar de Austria."

In issuing this decree, the active governor based his decision on

> "the nature and essence of this port, the principal key to this Kingdom in this region, for protection against many dangers, and the importance of its preservation, guarding and defense, from which follows service to God, to the King our Lord, and the defense of the Fatherland in which we dwell, where such loyal subjects, bound by so many obligations, are rooted in duty, and will come to its defense as best they can, considering the straits in which His Majesty finds himself, due to the great expenses incurred daily by this Crown and monarchy, in defense of our Holy Faith, against wars waged so fiercely by sea and land by the unfaithful enemies of this Crown, even going so far as to unite and ally themselves with Christian princes, a matter which demands such care and calls for a swift and effective remedy as soon as possible."[13]

By the end of the eighteenth century, the Fort of Buenos Aires consisted of a star-shaped walled enclosure, surrounded by a moat – except on the river front, as the wall was built on the edge of the ravine – with its corresponding drawbridge on the side facing the Plaza Mayor. It was situated where the Government House now stands. Thirty-five cannons, almost all 24-pounders, were positioned on the fort's extensive platform. Inside were the viceroy's quarters, the offices of the Royal Court, the offices of the Royal Treasury, the Royal Warehouses and the Royal Armory.

As a fortification, the value of the Fort of Buenos Aires was very relative, although its armament prevented enemy ships from approaching the city and landing on its banks. However, it must be borne in mind that the shallow depth of the river was already a powerful factor in the capital's security on that side, as ships of any draught – whether warships or transport vessels – could not approach the shore, either to bombard the city with their most powerful cannons or to land large numbers of troops.

On the land front, the fort's value was almost nil, as its artillery could not keep at bay an enemy seeking to take the city, because the nearby buildings obstructed the line of fire. At best, it would serve as a temporary stronghold to re-

13 *"Revista del Archivo General de Buenos Aires"*, Tomo 1, p.299

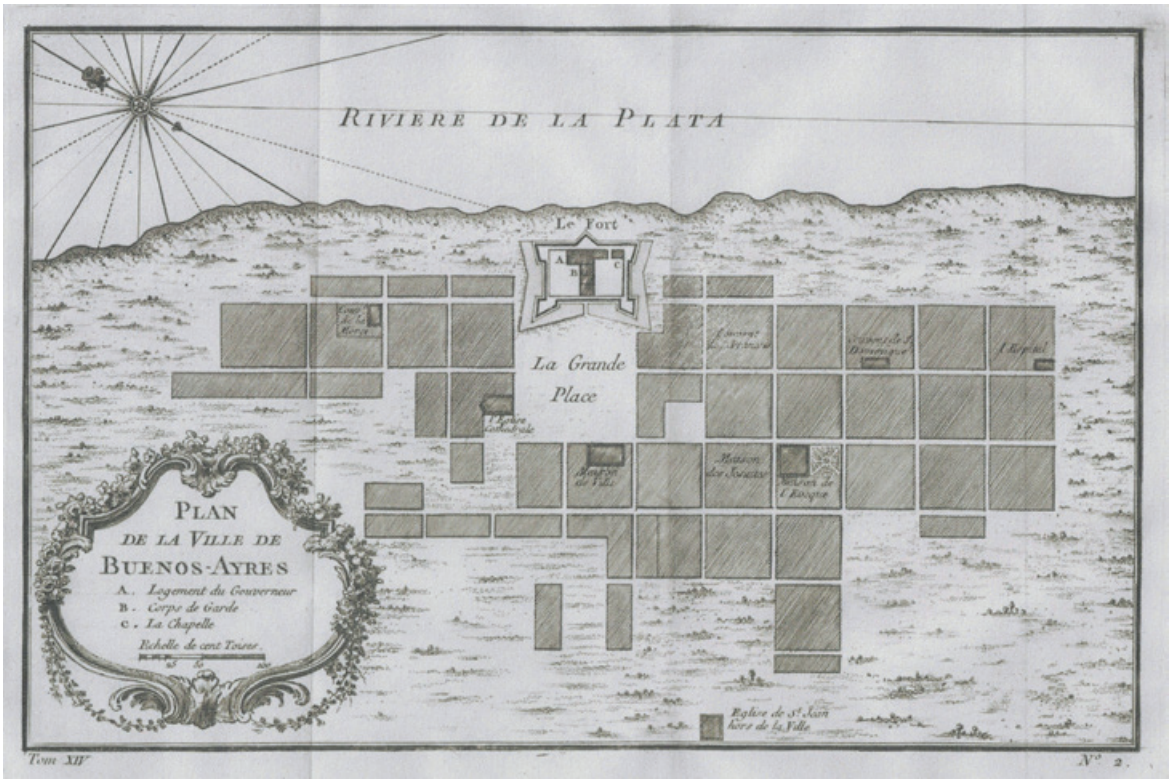

Fig. 2. Plan of the City of Buenos Aires – 1757. Bellin, Jacques Nicholas 1703–72. Published in Antoine François Prevost's 15-volume Histoire Générale des Voyages, written by Prevost and other authors between 1746 and 1790.

sist an assault by forces attempting to occupy the authorities' residence. The fort could, however, become a death trap, for once the enemy had occupied the city, all they needed to do was besiege the fort and prevent the entry of supplies, so that its defenders would, sooner or later, be forced to surrender due to starvation.

As supplementary works to the Fort of Buenos Aires, intended to increase the effectiveness of its firepower on the river front, large-caliber batteries were established at key points whenever an enemy expedition and possible landing were feared. Such were the batteries known as *Retiro*, *Muelle*, *Residencia* and *Recoleta*, not to mention others situated in more distant neighborhoods such as *Palermo*, *Los Olivos* and *Los Quilmes*.

Fort of Colonia del Sacramento

This city was originally a small settlement founded and fortified in 1679 by the Portuguese governor of Rio de Janeiro, Manuel Lobo, on the eastern bank of the *Río de la Plata*, on the site now occupied by the city of Colonia (Uruguay). In January 1680, a rudimentary fortress made of rammed earth was erected on the coast, with 200 soldiers and 300 families from Rio de Janeiro.

The objectives of this project were varied: to establish a stable base for smuggling with Buenos Aires, conceived as the most effective means of accessing the silver from Potosí (a policy which, for that very reason, was supported by England, which also saw this settlement as a route for its products to enter the South American inland); to ensure the continuity of the historical link between Rio de Janeiro and Buenos Aires dating back to its foundation; to provide support and protection to the *bandeirantes* who roamed the Jesuit missions and the Banda Oriental, making use of the cattle belonging to the settlers of Buenos Aires; and to establish a bridgehead for a potential invasion of Buenos Aires.[14]

This settlement was seen as a provocation by the Spanish authorities, given their concerns over the military security of the port of Buenos Aires; the following year (1680), the governor of Buenos Aires, José de Garro, seized the site after a month-long siege and razed the Portuguese fortifications. The expedition comprised 170 soldiers from the Buenos Aires garrison (145 veterans and 25 militiamen), 50 from Santa Fe, 80 from Corrientes, 300 from Córdoba and around 3,000 Guaraní Indians from the Jesuit missions, all of them serving as militiamen.

Despite the resounding success of the military operations, which were not approved by Carlos II of Spain, the colony was returned to the Portuguese on condition that they did not fortify it. On 28 May 1681, a provisional treaty was signed with the Portuguese crown, granting temporary possession of Colonia del Sacramento until the rights of the parties were confirmed. Spain was at war with France and could not afford to fall out with Portugal. King Carlos II dismissed Governor Garro and sentenced him to prison for having attacked the stronghold without a formal declaration of war. What had been won on the battlefield was lost on the diplomatic front.

14 Birolo, Pablo; *Militarización y Política* …, p.36.

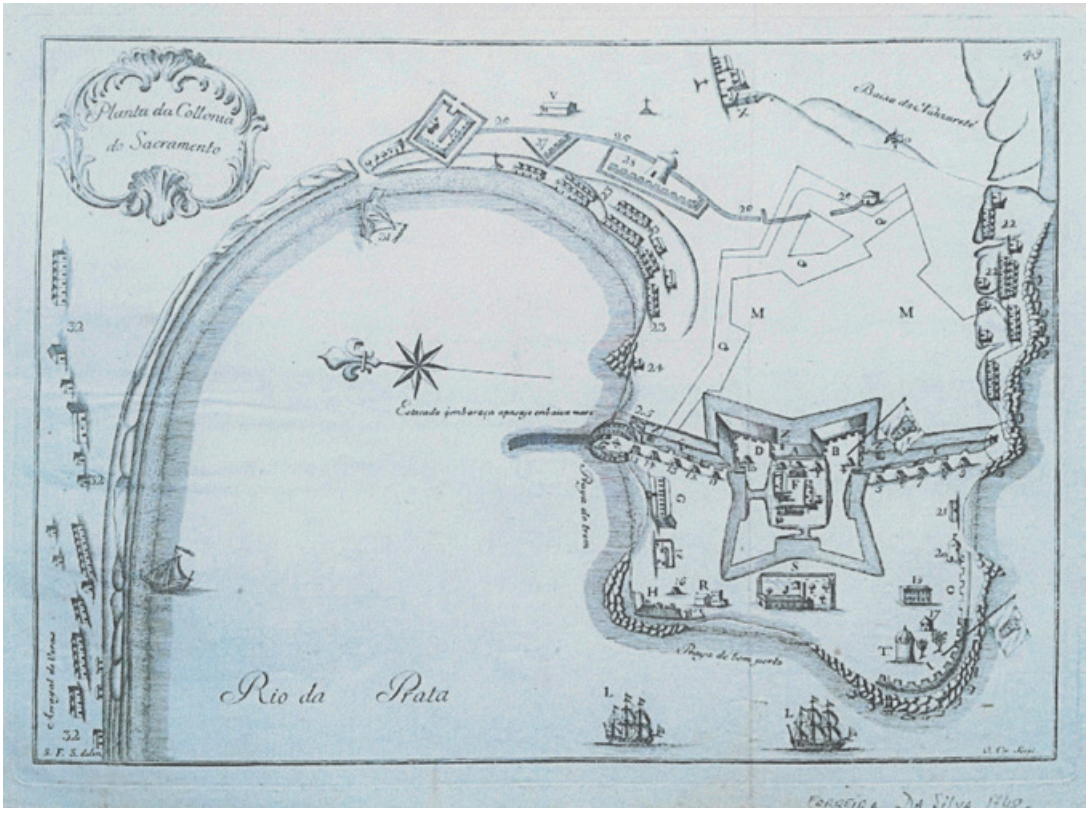

Fig. 3. Plan of *Colonia del Sacramento*. Map by Ferreira da Silva. Lisbon 1748

The Spanish regained possession from 1705 until 1715, when, under the Treaty of Utrecht, it passed back into Portuguese hands. Following the Treaty of Utrecht, signed on 6 February 1715, Colonia del Sacramento was returned to Portugal in accordance with Article XIV of the provisional treaty of 1701, and Field Marshal Manuel Gomes de Barbosa took possession of the stronghold on behalf of the Portuguese Crown on 4 November 1716.

This renewed occupation of the colony by Portugal led to the construction of the fortress and, subsequently, the establishment of the city of Montevideo.

Portugal had assigned great military and commercial value to Colonia del Sacramento, as its location opposite Buenos Aires particularly facilitated smuggling and the importation of slaves. For this reason, to ensure the preservation of their possession, they surrounded the colony with solid fortifications and a great

deal of artillery, especially on its landward side.

In 1731, still under Portuguese rule, the fortress had a rectangular layout, featuring four bastions, one at each corner.

In Madrid, on 13 January 1750, a treaty was signed between the crowns of Spain and Portugal; amongst other clauses, one stipulated that the latter nation ceded Colonia del Sacramento to Spain in exchange for the territory occupied by seven settlements belonging to the Jesuit missions on the Uruguay River. The Portuguese, through various maneuvers, delayed the proceedings arising from the 1750 treaty regarding the demarcation of boundaries, for which both crowns had appointed their respective commissions. These proceedings were underway when Andonaegui's successor, the illustrious soldier Pedro de Ceballos, arrived in Buenos Aires; his military prowess would prove crucial in securing Spanish territorial integrity in the *Río de la Plata*.

For the Spanish authorities, the situation in Colonia del Sacramento constituted a military problem of great importance. Consequently, in 1777, in accordance with the decree of Carlos IV of Spain, Viceroy Ceballos forced Colonia del Sacramento to surrender and demolished all its defensive works.

Consequently, this city, now in Spanish hands, was left more vulnerable to potential attacks from the water and by land, not only from the Portuguese but also from other possible attackers.

Two years later, during Cevallos's occupation of Colonia, war broke out between Spain and England in 1779. On this occasion, Viceroy Vértiz sent the military engineer Bernardo Lecoq[15] to Colonia to supervise the construction of works intended to establish a heavy-caliber battery for the protection of the port and to survey Martín García Island with a view to potentially establishing further batteries.

The works designed by Lecoq in Colonia del Sacramento were built and a heavy-caliber battery was established.

15 Bernardo Lecoq, a Spaniard, had studied engineering and joined the *Ejército Real*. By 1781, he was already serving in the Corps of Engineers of Buenos Aires. He carried out important missions and rose to the rank of colonel. He fought against the British during the second invasion of Buenos Aires (1807). Invited to the Open Cabildo of 22 May 1810, he voted in favor of the patriotic cause.

In early 1807, the four guns were transferred to Buenos Aires to bolster the defensive capabilities of the capital of the Viceroyalty, in anticipation of a possible second British invasion.

The Fort of Montevideo

The Portuguese possession of Colonia del Sacramento represented a serious problem for the development of Buenos Aires and its legitimate trade, in addition to the danger posed by its proximity to Buenos Aires, since in the event of an armed conflict the Portuguese would have an excellent base for their warships should they wish to blockade that port and even attack the city.

Yet it was necessary to endure this evil due to the inability -whether material or stemming from the clauses of appeasing treaties- to evict such a troublesome neighbor, provided that the latter did not overstep the bounds of conduct to which the impunity of his usurpation might lead him.

As early as the beginning of the eighteenth century, the Spanish Court, whilst conceding that the colony should remain under Portuguese occupation, issued orders to the governor of Buenos Aires to exercise the utmost vigilance and not to permit those 'who, in the inlets and ports of the River (de la Plata), and particularly in those of Montevideo and Maldonado, might erect fortifications or carry out other acts of occupation'.[16]

But even more categorical were the instructions issued on 11 October 1716 to the new governor of Buenos Aires, Bruno Mauricio de Zabala, as they ordered him to ensure "the necessary measures are taken so that neither Portugal nor any other nation may take possession of or fortify the areas of Maldonado and Montevideo, and to seek to populate and fortify them in whatever manner you may deem fit."

As the order to fortify Montevideo and Maldonado was reiterated in the following years in the face of the Portuguese preparations of troops and supplies in the colony, Governor Zabala resolved to carry it out, spurred on by an unforeseen circumstance. Towards the end of 1723, indeed, he received word that in the Port of Montevideo there were four Portuguese ships armed with two hun-

16 Real Orden dated 11 October 1716.

dred men ashore, having disembarked to take possession of the place.

The Spanish governor organized an expedition to attack the intruders and retake the position.

Nonetheless, they did not wait for the attack, but re-embarked on their ships. Zabala had a battery for ten cannons built "at the eastern tip of the cove," leaving there "one hundred and ten men and one thousand Indians from Misiones," to whom he entrusted the work on the other fortifications already planned.[17] On 2 April 1724, Zabala returned to Buenos Aires, where he had already sent the rest of the expedition.

Once the decision to found Montevideo had been taken and work had begun, it was necessary to secure the new city against a surprise attack by the Portuguese, who were undeterred in their aim of expanding towards the *Río de la Plata*. In the following years, the fortification works begun in 1724 by Zabala with the Punta del Este battery were continued, the city now being surrounded along its entire perimeter by a walled belt, with bastions and batteries at the most important points of the belt and a citadel commanding the landward front.

However, the absence of a uniform and progressive plan for the execution of the works and their maintenance in an efficient state, and, furthermore, the general shortage of funds to cover the cost of such costly works, consistently undermined the defensive value of the stronghold.

As early as 1770, the governor of the Province of Buenos Aires, Juan José de Vértiz, was pessimistic about the state of Montevideo's fortifications. A meeting was held at my behest in that stronghold, chaired by its governor and comprising several engineers and intelligent officers, and the entire fortification was assessed as being notably defective, as it had been built contrary to the principles of the art, lacking the thickness proportionate to its height to withstand the pressure of the earth, for lacking internal buttresses, the necessary quarters for the comfort and rest of the garrison, particularly in the event of a siege, and, finally, for lacking stability, as evidenced by the other bastions in the constant repairs made to close the cracks or openings visible in them.

But Governor Vértiz could hardly be satisfied with this simple observation.

17 Beverina, *El Virreinato* …, p. 46.

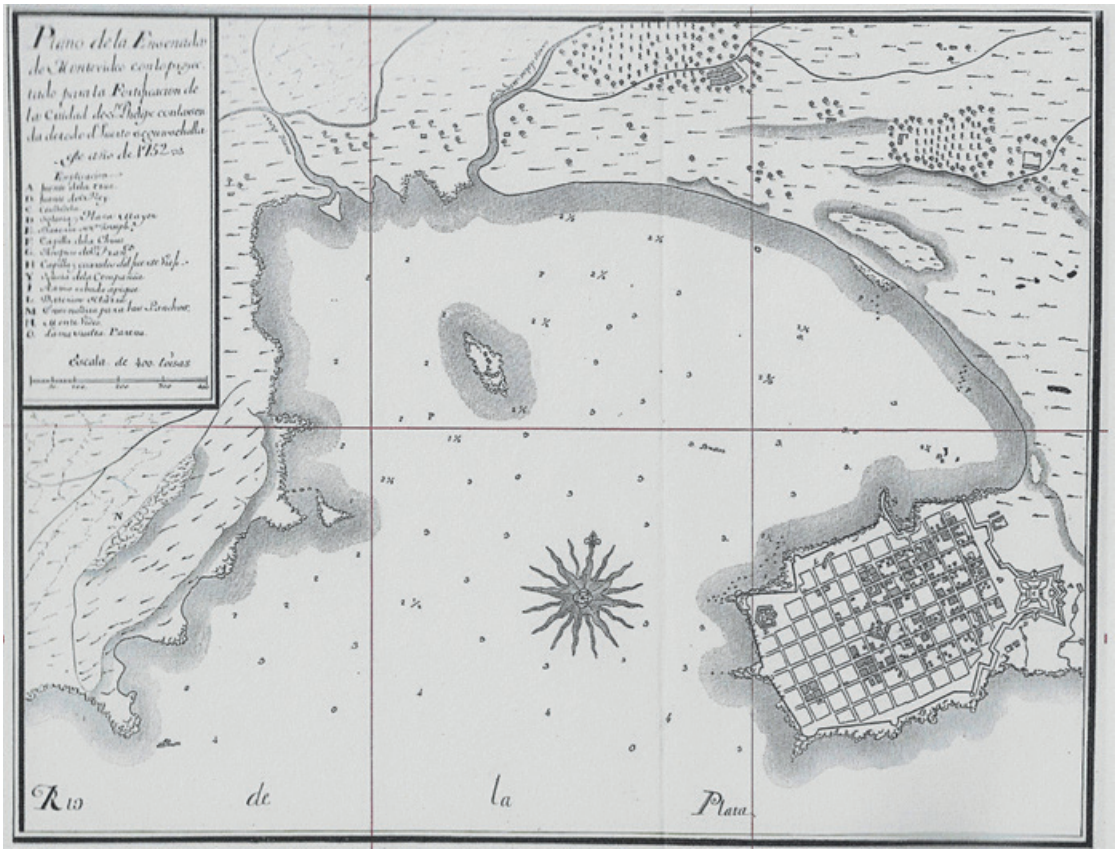

Fig. 4. Plan of the Montevideo Inlet showing the proposed fortifications for the city of San Felipe. 1752

The responsibility of his office demanded that he remedy the fault, even more so as he was convinced of the considerable importance of that point.

> "In the fortress of Montevideo" says Vértiz himself in 1784, upon handing over command to the new viceroy, the Marquis of Loreto, "the sole bulwark of the Provinces of Peru on the northern flank, and its loss would bring about general upheaval, for it would be a most fatal omen for the entire kingdom, as neither Maldonado nor any other part of the banks of the River (de la Plata) nor the sea on the other side could be held, since direct communication with Europe would be cut off and would have to be conducted via the lengthy detour through Brazil or via Chile and the Cape Horn; for if the enemies were to take Montevideo, they would also

> control the northern and southern channels; the dispatch of maritime mail, if not entirely impossible, would at least run an imminent risk of being captured. Our trade would be ruined, and the considerable proceeds of our mines would pass into foreign hands, whose industry would uncover the treasure that lies hidden amongst us through inaction or lack of expertise".

The Fort of Maldonado

In 1755, the governor of Montevideo, Joaquín de Viana, began to settle and fortify the bay of Maldonado, which years later enabled the defense of an area vital to Spain's interests, fostering the military and religious development of the region. It was the second most important city in the *Banda Oriental*, owing to its strategic position at the mouth of the *Río de la Plata* and its port.

The fortification of Maldonado, in Uruguay, was a crucial historical process for the defense and development of the region. In the eighteenth century, fortifications were built in the bay and on the Punta del Este peninsula to protect the area from attacks and secure Spanish control. These fortifications, such as the citadel and the Fort of San José, were part of a wider defensive system that included batteries and barracks.

Upon the creation of the Viceroyalty in 1776, Cevallos addressed the issues of defense and the organization of the forces, and upon returning from Spain after his 1777 campaign against the Portuguese, he left forty-seven artillerymen in Buenos Aires at the disposal of his successor.[18]

Two years later, Viceroy Vértiz, following the declaration of war on England, took a series of military measures, carrying out a general conscription of all fitted men in the Viceroyalty. He reinforced the scattered detachments, intensified the training of the militias, etc., and fortified those points along the coast which he considered most vulnerable. [19]

In Montevideo, the defenses along the sea and land fronts were reinforced, the necessary measures were taken in case of a prolonged siege, and a plan for the defense of the port was drawn up. In Maldonado, the existing fortifi-

18 Beverina, *El Virreinato* …, p.81.

19 Beverina, *El Virreinato* …, p.81.

cations at Punta del Este and La Aguada were completed and equipped with eight 24-pounder guns. In Colonia del Sacramento, a heavy-caliber battery was deployed to defend the port, and Martín García Island was surveyed with a view to establishing a battery there. At Ensenada de Barragán, the heavy-caliber battery established there was reinforced by adding a permanent garrison of veteran artillerymen and militiamen. At the Fort of Buenos Aires, the defenses were reinforced by increasing the number of heavy-caliber guns. At Retiro, Residencia and Riachuelo, a battery was constructed, with a total of ten heavy-caliber guns positioned to flank the beacons and the city's front line. Furthermore, several gun carriages were ready to be deployed or transported, if necessary, to the beaches of Palermo, San Isidro or Las Conchas.[20]

In 1780, a further artillery company was formed, to be distributed between Buenos Aires and Montevideo.

The effectiveness of the mounted artillery was immediately apparent, and in 1799 a request was made to increase the number of existing companies from two to three, on the grounds that

> "[T]he vast expanse of the coasts on both sides of the Río de la Plata, the multitude of locations along them that facilitate landing, the open nature of the countryside, the lack of fortifications and even of strongholds capable of offering a reasonable defense, and the shortage of troops to form mobile camps of sufficient strength, make it clear that the only resistance that can be offered to enemy landings and that would avert the serious consequences of their success is that provided by the horse-mounted artillery trains [caballeria volante]."

Deployed alongside dragoons and light cavalry, they formed detachments or mobile camps that could be rapidly moved to the threatened location. The equipment used consisted of cannons not exceeding 8-pound caliber and 6-inch howitzers, grouped into mobile artillery train divisions, generally comprising four cannons and two howitzers.[21]

20 Beverina, *El Virreinato …*; p.82

21 Beverina, *El Virreinato …*; p.82

The fortification process in Maldonado:

> "The port of Maldonado, situated at this entrance to the Río de la Plata, is a refuge that the enemy may use, since they can gather there and prepare to advance on this stronghold (that of Montevideo), and also for the arrival of their fleet, which, having entered the river, may find itself forced by the contrary winds—which usually blow strongly—either to take the said port or to head out to sea, due to the danger posed by the coast."

In these terms did the War Council meeting of 17 July 1797 in Montevideo with Viceroy Olaguer Feliú in attendance to prepare a defense plan, express the importance of that point.

As early as 1777, Viceroy Ceballos had requested authorization from the monarch to fortify Maldonado, and a Royal Order of 10 December of that year "ordered that it be carried out in the manner most suitable for its defense, with the necessary budget for Royal approval, without the execution of the work being suspended for this reason".

By virtue of this authorization, Cevallos instructed the Governor of Buenos Aires, Juan José de Vértiz – who was in Montevideo at the time – to convene a committee of the senior officers present there, to determine "the type of fortification best suited to the terrain and location".

The committee proposed the construction of a quadrilateral fort with four bastions, a moat and a covered walkway, and within it a cistern, stores for supplies and provisions for four months, as well as barracks for three hundred men, all of these buildings to be bomb-proof; leaving it to the discretion of the chief engineer in charge of the works not only to choose the most suitable site for construction, but also to determine the direction of the gun emplacements, etc. The budget was estimated at six hundred thousand pesos, although it was presumed that it would easily reach a million or more "due to the high cost of labor and materials, and the few or no advantages that the location offers for an undertaking of this nature.."

Before work began, Vértiz replaced Cevallos as viceroy. The new official, who was opposed to the fortification of Maldonado whilst the more urgent problem of the works planned for the square in Montevideo remained unresolved—since, should the funds requested from the viceroy of Lima ever be obtained, they should be used solely for the latter—was quick to write to the

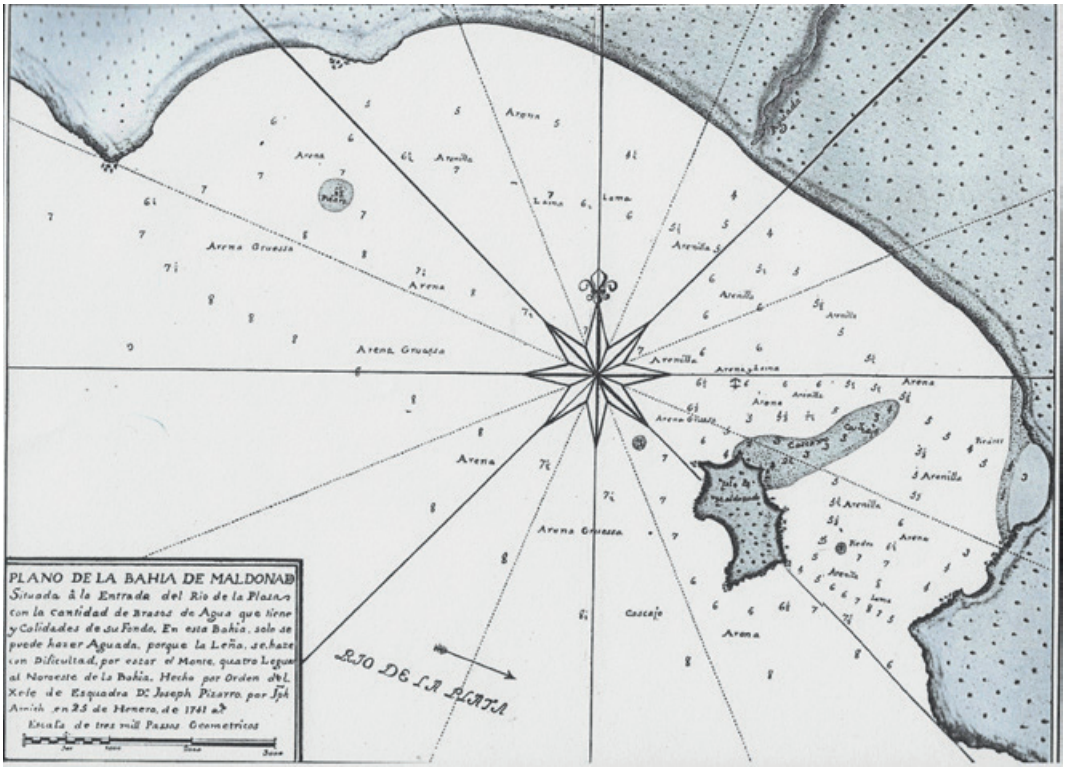
PLANO DE LA BAHIA DE MALDONAD
Situada à la Entrada del Rio de la Plata
con la cantidad de Brazas de Agua que tiene
y Calidades de su Fondo. En esta Bahia, solo se
puede hacer Aguada, porque la Leña, se hace
con Dificultad, por cazar el Monte, quatro Leguas
al Noroeste de la Bahia. Hecha por Orden del
Xefe de Esquadra D. Joseph Pizarro, por Jph
Amich en 25 de Henero, de 1741 a
Escala de tres mill Pasos Geometricos
RIO DE LA PLATA
Arena
Arena Gruessa
Arenilla
Lama
Cascajo

Fig. 5. Map of Maldonado Bay, situated at the mouth of the Río de la Plata. Drawn by José Amich, on order of the Commander-in-Chief of the Fleet, José Pizarro. Buenos Aires, 25 January. 1741.

court, demonstrating the advisability of revoking the provision contained in the Royal Order of 10 December 1777.

The King accepted the reasons put forward and "considering that the revenue of the Royal Treasury does not provide sufficient funds to undertake two works of such magnitude at the same time", resolved that "the fortification of Maldonado should be suspended until further notice. However, if it should seem advisable for the greater safety of our navigation, a battery of the same kind should be constructed in Maldonado, of such size and configuration as is best suited to local circumstances."

The provisional works ordered were carried out, with a battery established on Gorriti Island and two on the mainland, named La Aguada and Punta del

Este. Later, towards the end of 1779, wishing to strengthen the defenses of Maldonado, Viceroy Vértiz commissioned the engineer Miguel Juárez

> to examine whether it would be advisable to construct on it (the island of Gorriti) the battery referred to in the Royal Order of 28 May 1779; and having surveyed the circumstances of that island with scrupulous attention, he replied that not only should the battery not be built, but that the one already there must be demolished, as was indeed done: in its place, he proposed to extend and fortify the two batteries on the mainland, known as Punta del Este and Aguada, by constructing a moat and covered approach, which were shortly thereafter reinforced with eight 24-pounder cannons.

The fortification of Maldonado was carried out to ensure the protection of the bay and the region, which were important to Spain due to their strategic location and resources. A citadel with 50 cannons was built to defend the central area of Maldonado, a wall with 14 batteries was erected to protect the coast, and a fort was constructed at the entrance to the bay to control maritime access.

The Fort of Ensenada de Barragán

The Spanish government's concern for the security of both banks of the *Río de la Plata* against possible attacks by the Portuguese, English, etc., focused primarily on the security of the eastern coast, though without neglecting the coast of the city of Buenos Aires. For this reason, in addition to fortifying the city, it considered *Ensenada de Barragán*, which constituted a natural deepwater harbor, situated on the western bank of the estuary and a short distance from the capital, approximately 70 kilometers away. Ensenada was a potential landing site for enemy expeditions aiming to attack Buenos Aires.

In 1727, the governor of Buenos Aires, Don Bruno Mauricio de Zabala, entrusted the pilot Juan Antonio Guerrero with the task of surveying the channels of the Río Santiago. To successfully complete his mission, Guerrero travelled along the southern bank of the river and entered what was then a cove that began on the western side of Monte Santiago and extended to the present-day channel of the port of La Plata. The reconnaissance was of great importance to Zabala, who, having received the report, undertook a journey to the site in the company of the pilot Pedro Navarro and the engineer Domingo Petrarca. This resulted

in the nautical chart presented by the latter in May 1730, which opened up the Barragán Inlet, for the defense of which a fort was planned.

At that time, he owned almost all the lands that had belonged to his grandfather, Gutiérrez Barragán, Sergeant-Major Pablo Barragán.

In 1731, the governor of Buenos Aires ordered the construction of the planned fort at Ensenada de Barragán, situated at the confluence of the *Río Santiago* and the *Río de la Plata*.

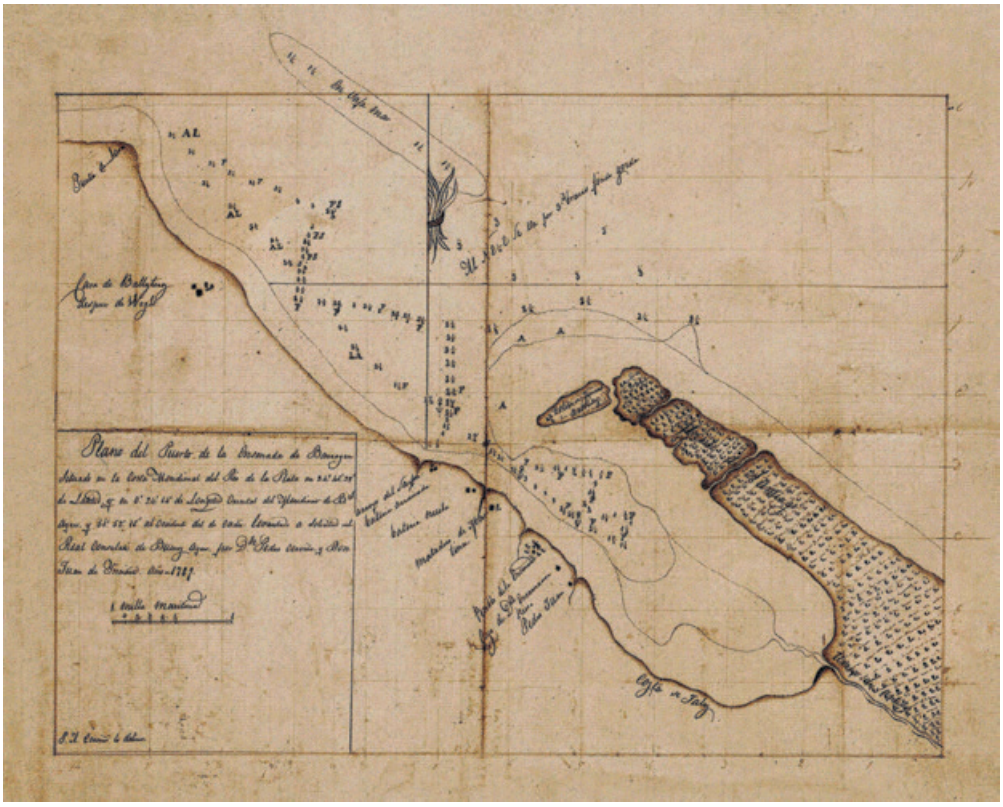

Fig. 6. Map of the Port of Ensenada de Barragán, drawn up at the request of the Royal Consulate of Buenos Aires by Pedro Cerviño [22] and Juan de Ynciarte. 1789.

22 Pedro Antonio Cerviño (Campo Lameiro, Pontevedra; 6 September 1757 – Buenos Aires; 29 May 1816) was a Spanish-Argentine military engineer, surveyor, cartographer, publisher and teacher who played a prominent role in the Viceroyalty of the Río de la Plata; he published the second newspaper in the city of Buenos Aires and played a part in the May Revolution of 1810.

Before 1770, there were four batteries for the defense of the cove, named *La Nueva*, *Santiago*, *San José* and *San Bruno*, as recorded in a hydrographic chart. The fort was surrounded by a wall of burnt adobe bricks, which, despite having been abandoned for many years and subjected to periodic river floods, has largely retained its original appearance. At its corners there were sentry boxes which served as shelters for the sentries, and although in a state of ruin, they have survived to the present day, and some cannons from the old batteries can also be seen.

Towards the end of 1775, Vértiz had a structure built to house an 8-gun battery that commanded the entrance to the port of Barragán. The garrison consisted of a company of artillery militiamen, which at its peak numbered 230 men.

In 1779, following the declaration of war between England and Spain, Viceroy Vértiz ordered the fortification of the *Río de la Plata* coastline, and Fort Barragán was repaired, with new batteries installed there. Ten years later, whilst Malaspina's hydrographic surveys were being carried out, the Viceroy, the Marquis of Loreto, ordered changes to the fort's artillery and improvements to its operations.

Shortly afterwards, in 1782, flooding of the river destroyed part of the walls and damaged some of its buildings.

In 1800, Artillery Captain Francisco Javer de Reyna, on the orders of Viceroy Avilés, carried out further works and repairs, employing Indians brought from Misiones for this purpose; and in 1806, under the command of Santiago de Liniers y Bremond, when the first British invasion took place, the cannons of the old fort engaged the enemy ships.

Conclusions

The European powers at war with Spain sought to undermine its interests by taking various measures against its possessions in the Americas, with the aim of curtailing Spanish power, disrupting its maritime trade routes and advancing into the territories of the *Río de la Plata* region, from which vast economic resources originated.

The authorities in Buenos Aires were compelled to undertake significant efforts to safeguard vulnerable locations throughout the region. They constructed

Fig. 7. Fuerte Barragán today (photo by the author)

fortifications not only in Buenos Aires and Montevideo, but also at strategically important points along the vast maritime and riverine coastline. These defensive measures had to be carried out with the limited resources and means available locally, as the considerable distance from Spain, the lack of support from the government in Lima, and various bureaucratic hurdles made it difficult to secure additional supplies and assistance. As a result, the defense of these areas relied heavily on the resources of local administrators and communities.

Throughout the period examined in this chapter, a pattern emerged that would be repeated with some regularity: what was gained on the battlefield by local armed forces was lost diplomatically in the metropolis because of the priority given to the European political agenda. Such decisions, which entirely revealed the colonial status of the South American possessions, would likely have provoked outrage among the inhabitants of the Río de la Plata. Outcomes of this nature became factors that challenged the veracity of the discourse coming from Spain and, consequently, contributed to the formation of an incipient local and autonomous consciousness, as demonstrated by the defense of Buenos Aires and Montevideo in 1806 and 1807, and the subsequent May Revolution in 1810, and the declaration of independence in 1816.

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Warfare with Spade and Pickaxe

The neglected Role of Fortified camps in the 18th century

by Alexander Querengasser

Field fortifications played a significant role in European military history long before the First World War, and not only during sieges. They substantially increased a defender‘s chances of victory, which is why battles were relatively rare near fortified camps, although a number of prominent exceptions can be identified during the 18th century. This short article aims to briefly explain the reasons why armies established fortified camps during this period, how their military significance should be assessed, and what risks were nevertheless associated with them.

The role of field fortifications in the warfare of the Ancien Régime – apart from siege warfare – is still greatly underestimated by researchers today. Apart from the field fortifications constructed during a siege, these were essentially used on three occasions: 1) in the form of a redoubt or bastion to secure a specific point, such as a river crossing or a harbor entrance, 2) as a line of several earthworks connected by a rampart to cover the area[1], or 3) as a “substitute fortress” to strengthen an encampment and potential battlefield. While all of these deserve more intensive studies, in this article we want to focus on the fortified camps.

1 Apart from siegeworks these are the better studied fieldworks of this time. I have written about them in: Alexander Querengässer, ´Barocke Kriegsführung mit Schaufel und Spitzhacke`, in: Mitteilungen Landesverein sächsischer Heimatschutz e.V. 3 (2022), pp. 35-38. See footnotes for literature on individual examples. A late example for historical and archaeological research is presented in: Haik Porada e.o., ´Die Untersuchung einer Postierungslinie aus dem Nordischen Krieg in Vorpommern als Beispiel für interdisziplinäre Forschungen zur Landesgeschichte`, in: Blätter für deutsche Landesgeschichte 159 (2023), pp. 245-328.

The risk of field battles

Battles were and are high-risk military events that can significantly limit an army's striking power and thus its military-political threat potential, even in the event of victory.[2] Johann Friedrich von Flemming therefore advised extreme caution in "*Der vollkommene Teutsche Soldat*" when considering a battle: "Since the outcome of battles is very uncertain, and the welfare of a ruler and country, or even its total ruin, often depends on a single battle, a general should not make a quick decision and should not attack the enemy until he has carefully considered all the advantages and every single circumstance, and has good reason to believe that a successful battle might be won."[3]

Even the best general could not anticipate all the uncertainties of a battle. Especially in the early modern period, commanders usually only had a rough idea of the enemy's numerical strength and the terrain. Other factors, such as morale, which could fluctuate from formation to formation within an army and change during the course of the fighting, could be influenced but were difficult to determine. Ultimately, even with the best troop training and the highest competence among the officer corps, coordinating complex movements across a battlefield that was often several kilometers wide remained a communication problem. Rapid visual communication, for example via light or flag signals, was only developed in the mid-19th century,[4] although the means for it existed al-

2 About the decisiveness of battle see: Jeremy Black, *Great Battles of all Time* (London: Thames&Hudson 2022); Alexander Querengässer, *Große Schlachten und Belagerungen der Weltgeschichte* (Berlin: Miles Verlag 2024).

3 Quot.: Johann Friedrich von Flemming, Der Vollkommene Teutsche Soldat : welcher Die gantze Kriegs-Wissenschafft, insonderheit was bey der Infanterie vorkommt, ordentlich und deutlich vorträgt, und In Sechs besondern Theilen Die einem Soldaten nöthige Vorbereitungs-Wissenschafften, Künste und Exercitia, die Chargen und Verrichtungen aller Kriegs-Bedienten, von dem Mousquetier an bis auf den General; Alle in dem Kriege vorfallende Actionen und Expeditionen, Feldzüge, Mærche und Schlachten; die Besorgung einer Festung und Guarnison bey Friedens-Zeiten, und die Beschützung wieder feindliche Gewalt in Kriegs-Zeiten, auch deren Attaque und Eroberung sowol defensive als offensive lehret ; Nebst einem Anhange Von gelehrten Soldaten, Adel und Ritter-Stande, von Duellen, Turnier- und Ritter-Spielen, auch Ritter-Orden &c. (Leipzig 1726), S. 285.

4 In the 1850s, Albert J. Meyer (1828-1880) developed a communication system based on flag signals and established a Signal Corps for the Union during the Civil War. The system he used was also adopted by the Confederates. Around the same time, several armies experimented with heliographs, which used mirrors to transmit sunlight as Morse code.

ready in the early modern period. Instead, after the initial acoustic signals—that is, the predetermined number of cannon shots to open a battle—commanders relied on messengers on horseback to deliver orders and messages from one end of the battlefield to the other. This presented several problems. Firstly, the military situation changed during the time it took a rider to travel from sender to recipient of a message. Secondly, he first had to find his recipient.

The tactical control of individual regiments on the battlefield also proved to be extremely complicated, as military personnel in the 18th century often had only inadequate maps. Furthermore, early modern cartography was unable to provide a military commander with an accurate topographical representation, not least because there was no method yet for graphically depicting varying elevations. Accurate maps, which in any case were primarily in the hands of high-ranking generals and hardly ever found in those of regimental officers in the early 18th century, therefore did not replace on-the-ground reconnaissance.[5] This was also the view of Sébastien Le Prestre de Vauban:

> "There are few places in Europe today for which we do not have ground plans; most are even printed. Although the majority are not accurate, they can still be used to glean some information (…) One can also gather information about the condition of the place from the inhabitants of the country (…) One must not rely entirely on everything one learns through such means, but must also make use of everything one can learn through oneself. Therefore, one must scout the places oneself, or at least have it done by wise and knowledgeable people (…)".[6]

The „places in Europe," for which Vauban had sufficient ground plans, were indeed fortified strongholds, but his descriptions were equally relevant for understanding rural regions, as Frederick the Great wrote half a century later in his „*General Principles of War*":

> „In the countryside, one must distinguish the fertile areas from the

The US Army made extensive use of heliographs during the Indian Wars, and the British used them in the Boer War, see: Daniel Woods, ´Heliograph and Mirrors` , in: Christopher Sterling (ed.), *Military Communications: From Ancient Times to the 21st Century* (Santa Barbara – Denver – Oxford: ABC Clio 2008), pp. 208-211.

5 Jeremy Black, *Maps of War. Mapping Conflict through the Centuries* (London – New York: Bloomsbury 2016), pp. 38-67.

6 Quot.: Sebastian Le Prestre de Vauban, *Der Angriff und die Vertheidigung der Festungen* […] *Erster Theil. Vermehrte und verbesserte Auflage* (Berlin 1751), pp. 19-20.

> barren ones and consider which marches the enemy can make, or how one must march to get from one large city to another or from one river to another. One must also note and record the best camps along those roads. Flat lands are quickly learned. They lie before you like an open map. In contrast, wooded and mountainous regions are difficult to learn because the view is always limited. However, to acquire this important knowledge, one rides into the mountains with a map in hand and takes with one the village mayors of the neighboring villages, or hunters, shepherds, and even butchers. […] If you see a mountain that towers above the others, you must climb it to get an idea of the region you can see from there."[7]

Johann Gottlieb Tielke, a professional engineer, in the last quarter of the century declared proper maps as essential for any work:

> "Wether a country is measured by paces or merely taken up by the eye, a scale must be added to the plan: otherwise it will be extremely imperfect, or perhaps I might say, almost useless. Such a scale can always be made from a map of the country, and it is not to be supposed that an Engineer would undertake such a business without one."[8]

In every early modern battle, it was therefore essential to assign a precise objective to attacking troops beforehand. The more complex the terrain, the greater the risk that subordinate generals or regimental commanders would miss their assigned targets. To avoid jeopardizing the cohesion of the line, small pivots or corrections could only be made at a slow pace. Marshal Maurice de Sax described the difficulty of both methods: "One cannot march a battalion that is only four men high [i.e., consists of four ranks, note A.Q.] against the enemy without falling into the aforementioned error. For if one does not crawl like snails, one will always approach him with open ranks."[9] Therefore, Flemming also recommended: "It is best to approach the battalion at a slow pace, because such battalions remain in better order and close formation, and can also rest and catch their breath more easily than the others who hurry too much."[10]

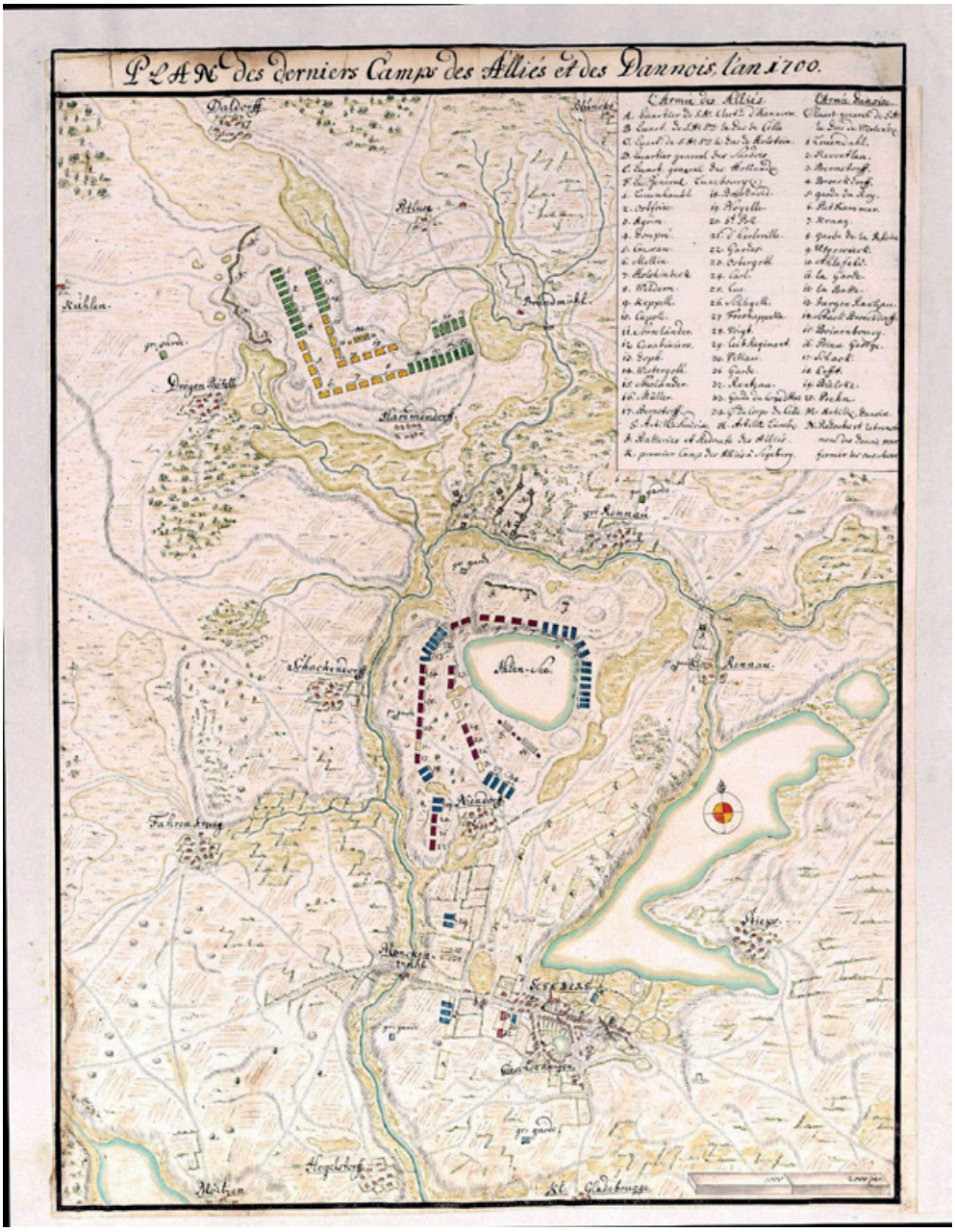
Maintaining closeness, that is, marching "shoulder to shoulder" or at least

7 Quot.: Werke Friedrichs des Großen VI, p. 20.

8 Quot.: Tielke, *The field engineer*, p. 191.

9 Quot.: Moritz Graf von Sachsen, Einfälle über die Kriegskunst: ed. by Zacharie de Pazzi de Bonneville: Aus dem Französischen ins Deutsche übersetzt von Georg Rudolph Fäsch, Leipzig – Frankfurt 1757, p. 32.

10 Quot.: Flemming: Der vollkommene Teutsche Soldat, p. 289.



1 Segeberg 1700. WHK 10 Nordischer Krieg von 1700-1719: Feldlager der Alliierten und der Dänen bei Bad Segeberg, 1700 - Deutsche Digitale Bibliothek

elbow to elbow, was of fundamental importance for an infantry formation. Only in this way could safe firing be guaranteed and steadfastness ensured against potential counterattacks, especially by cavalry. Frederick the Great underscored this importance in an instruction for the Major Generals of Infantry from 1756:

> "When the entire army engages the enemy, the first duty of the generals is to ensure proper alignment once it has been given to them (…) The generals commanding the corps that launches the first attack must bring their men forward in good order."[11]

Maintaining this good order was difficult even on level ground. Terrain with contours and obstacles, such as forests, bushes, ponds, fences, ditches, or houses, further hampered troop cohesion. Often, these obstacles even prevented the commander from maintaining a complete overview of all his troops and making corrections if a section missed its intended objective. Thus, Eugene of Savoy complained that in the Battle of Luzara, „the entire rear line missed its way [missed the path, note A.Q.] and lingered for over an hour and a half."[12]

In the Battle of Poltava (1709), the Swedish battle formation was disrupted in part because the battalions of the infantry center, under Major General Carl Gustaf Roos, first had to capture several advanced Russian redoubts, losing valuable time in the process. By the time the remaining infantry had broken through the Russian line and prepared to attack the enemy camp, a third of the force was missing. General Rehnskjöld, leading the infantry, however, had no idea where Roos's battalions were located, delayed the attack, and initially sent several staff officers, and later even cavalry and two additional battalions, to search for the missing troops. The attack timeline was thus completely thrown off.[13]

Streams and small rivers in particular threatened not only to disrupt the lines but, in the worst-case scenario, to weaken the infantry's firepower. In his report to Emperor Joseph I on the Battle of Cassano (1705), Prince Eugene describes how his infantry had to cross a canal, so that „their weapons and ammunition

11 Quot.: Werke Friedrichs des Großen VI, p. 270.

12 Quot.: Militärische Korrespondenz des Prinzen Eugen von Savoyen. Aus österreichischen Original-Quellen. Erster Band: Jahr 1697 bis Ende August 1702, ed. by F. Heller, Wien 1848, p. 458.

13 Orjan Martinsson, ´The lost Battalions of Roos at Poltava`, in: Steve Kling (ed.): *Great Northern War Compendium. A collection of articles on the Great Northern War*, Vol. I (St. Louis: THGC Publishing 2015), pp. 15-20.

got completely wet on their bodies, and therefore they could hardly shoot anymore.“[14]

An advance against the enemy was thus always fraught with risk. The looming threat of combat, and the accompanying death and wounding of comrades, increased the psychological strain on the troops. In the second half of the 18th century, the British Major General William Heath listed several advantages of offensive movements:

> „In the advance, although annoyed by the enemy‘s fire, the dead and wounded are left behind as they fall, and the troops feel the exhilaration of reaching, in a few minutes, the point where they can put their own weapons to use and avenge the injustice done to them.“[15]

In contrast, remaining in open terrain could prove disadvantageous: „But when the men are posted in the open and exposed to the enemy‘s artillery fire, at such a great distance that they cannot use their own weapons in defense, the dead and wounded fall all around them or are carried away, and every groan they make is heard.“[16]

Forcing the enemy to fire the first volley was psychologically important, as it rarely caused such heavy losses as to lead to the collapse of a formation. If the enemy then advanced further and fired their own volley at close range, this could again have devastating psychological consequences. Time and again in the Great Northern War, it was the Swedes who advanced to within a few paces of the enemy and secured this advantage, as in the Battle of Gadebusch in 1712: „Nevertheless, the Swedish soldier, with musket slung over his shoulder, went into the Danes‘ line of sight, withstood their fire, and did not release his rifle until he was within ten to fifteen paces of them. For in this way he was certain that everything he encountered would either fall or retreat.“[17] Therefore, if a side

14 Quot.: Militärische Korrespondenz des Prinzen Eugen von Savoyen. Aus österreichischen Original-Quellen. Zweiter Band: Jahr 1703 bis Ende August 1705, hrsg. von F. Heller, Wien 1848, p. 637.

15 Quot.: William Heath, The Revolutionary War Memoirs of Major General William Heath, ed. by Sean M. Heuvel, Jefferson (North Carolina) 2014, p. 109.

16 Quot.: Ibid, p. 109.

17 Quot.: Jörran Andersson Nordberg, *Leben Karl des Zwölften Königs in Schweden mit Münzen und Kupfern*
Vol. 2, (without place 1746), p. 383.

decided to await the enemy‘s attack, it could, if necessary, secure its position with additional field fortifications.

For this reason, armies occasionally chose to construct redoubts on the battlefield, thereby surrendering the initiative to the enemy from the outset. French Marshal Villars opted for this approach on the eve of the Battle of Malplaquet, well aware that his opponent, Marlborough, usually launched his final thrust through the enemy center, which he now secured with large redoubts. Although the allied troops succeeded once again in breaking through the French center, they suffered more than twice the casualties in the fighting around the redoubts compared to the French, who were able to withdraw from the battlefield in an orderly fashion. The Russian army also reinforced its positions at the Battle of Poltava with several field redoubts staggered in depth, which acted as breakwaters and halted the Swedish attack. In fact, Charles XII‘s regiments had no idea of the number and size of the Russian redoubts. The Russian bivouac at Poltava closely resembled the concept of a fortified camp.

Construction and Constructors

The spade only became a universal piece of equipment in many Western armies in the last third of the 19th century, which raises the not unreasonable question of who constructed such camps with what in the 18th century. The soldiers themselves, and if necessary, local farmers, were to be primarily responsible for the entrenchment work. In his book “*Der vollkommene teutsche Soldat*,” Flemming quotes the articles of Christian V of Denmark (r. 1670–1699) concerning the duties of a soldier:

> “No one shall refuse to perform what is ordered of him for our benefit, whether it be work, demolition, or construction in the camp, entrenchments, and fortifications, or, in case of need, assisting the artillery on the march, with horses, hauling, and lifting, or in any other way, however it may be.”[18]

According to Flemming, Danish and Swedish soldiers, in particular, were more heavily involved in such work during peacetime than was customary in other armies. “Although this activity might not seem particularly proper to sol-

18 Quot.: Flemming: Der vollkommene Teutsche Soldat, p. 484.

diers in peacetime, it is nevertheless very good; it keeps them well-practiced."[19] The Theatrum Europaeum mentions that the Danes deployed 500 "pioneers" during the siege of the fortress of Tönning in 1700,[20] who were not conscripted soldiers but rather farmhands obligated to perform labor service. With Major Generals Andreas Fuchs (1641–1720) and Jobst von Scholten (1644–1721), the army also had two experienced engineers at its disposal, both of whom had been trained in the Dutch school. Since large quantities of entrenching tools were also needed for the siege of the fortress, it can be assumed that these were still available to the army when it established its fortified camp near Segeberg a short time later.[21]

In fact, providing the tools was often more costly and complicated than providing the manpower. When the Saxon army established its camp near Pirna in 1756, it benefited from the proximity of the Dresden main arsenal, from which entrenching tools and bridge-building materials could be transported up the Elbe by barge. The regiments, brought in from all over the country, had sometimes had to leave their tools behind. For example, the Saxon commander-in-chief, Count Friedrich August von Rutowski, received word from the colonel of his own dragoon regiment that „the necessary shovels cannot be consistently procured."[22] The engineer corps had already been transferred to the high plateau on August 24th to mark out encampments for the regiments. Although almost the entire army was assembled on the high ground, sources confirm that local farmers were also called upon to work on the construction of the fortifications as part of the draft animal service. Since the Eastern Ore Mountains were still a mining region, miners could also be conscripted; however, Rutowski complained to General Pirch at the beginning of September that "no more than 64 of them came to work today"[23] and asked the general to assign additional soldiers. Five

19 Quot.: Ibid, p. 485.

20 Theatrum Europaeum, oder außführliche und warhafftige Beschreibung aller und jeder denckwürdiger Geschichten, so sich hin und wieder in der Welt, fürnemblich aber in Europa und Teutschlanden, sowol im Religion- als Prophan-Wesen, vom Jahr Christi ... biß auff das Jahr ... exclus. ... sich zugetragen […] Bd. 15, Frankfurt a.M. 1707, p. 755.

21 I was part of an excursion made up by historians, geographicans and archaeologists which examined this camp. The results shall be published in an essay collection.

22 Quot.: Salisch, *Treue Deserteure*, p. 73.

23 Quot.: Ibid, p. 82.

years later the Prussians works at Bunzelwitz were constructed by the soldiers themselves. Frederick organized his troops in a way that always half the army could be used for the construction work.[24]

For the construction of their fortified camps during the War of the Bavarian Succession the Austrian used more than 3.000 civilian workers.[25] During the American War of independence, preparing the fortifications he had to build at Yorktown, General Lord Cornwallis received tools together with few reinforcements from New York. As for workers he was able to use Virginia slaves, but there were not enough of them and many of those following the army have been sick of smallpox. Cornwallis also was not willing to have the work done by soldiers because of the heat. Because of this an engineer on 22 August estimated the time necessary to build all the fortifications according to the state of the art at six weeks.[26]

The 18th century saw an increase in the publication of theoretic work about military engineering, starting with Sébastien Le Prestre de Vauban and Menno van Coehoorn (1641–1704), who shaped the discourse on the construction of field fortifications, especially during sieges, in the late 17th century. Many of Vauban's works, such as "Mémoire pour servir d'instruction dans la conduite des sièges" and "*Traité de l'attaque et de la defense des places*," were only printed posthumously in the Netherlands. Coehoorn's treatise "*Nieuwe vestingbouw op en natte of lage horizont*," published in 1685, was translated into English and French in 1705, and into German in 1709. In "Traité de l'attaque et de la defense des places," Vauban lists a long set of tools that an army should bring from its storehouses to construct field fortifications. Later on during the 18th century men like Jaques Francois de Chastenet de Puységur in his "Art de la Guerre", Marc-René de Montalembert with his eleven volume "La fortification perpendiculare" or Frederick the Great in his "Betrachtungen über die

24 Another understudied case, see: Marcus von Salisch, „Der Feldzug von 1761 und das Lager von Bunzelwitz – Friedrich II. in der Defensive", in: Eberhard Birk / Thorsten Loch / Peter Andreas Popp (ed.), *Wie Friedrich „der Große" wurde. Eine kleine Geschichte des Siebenjährigen Krieges* (Freiburg i. Br. – Berlin – Wien: Rombach Verlag), pp. 237-242, here p. 241.

25 Alexander Querengässer, *The War of the Bavarian Succession 1778-1779. Prussian Military Power in Decline?* (Warwick: Helion & Company 2023), p. 75.

26 Richard Middleton, *Cornwallis. Soldier and Statesman in a revolutionary World*, New Haven – London: Yale University Press 2022), pp. 95-96.

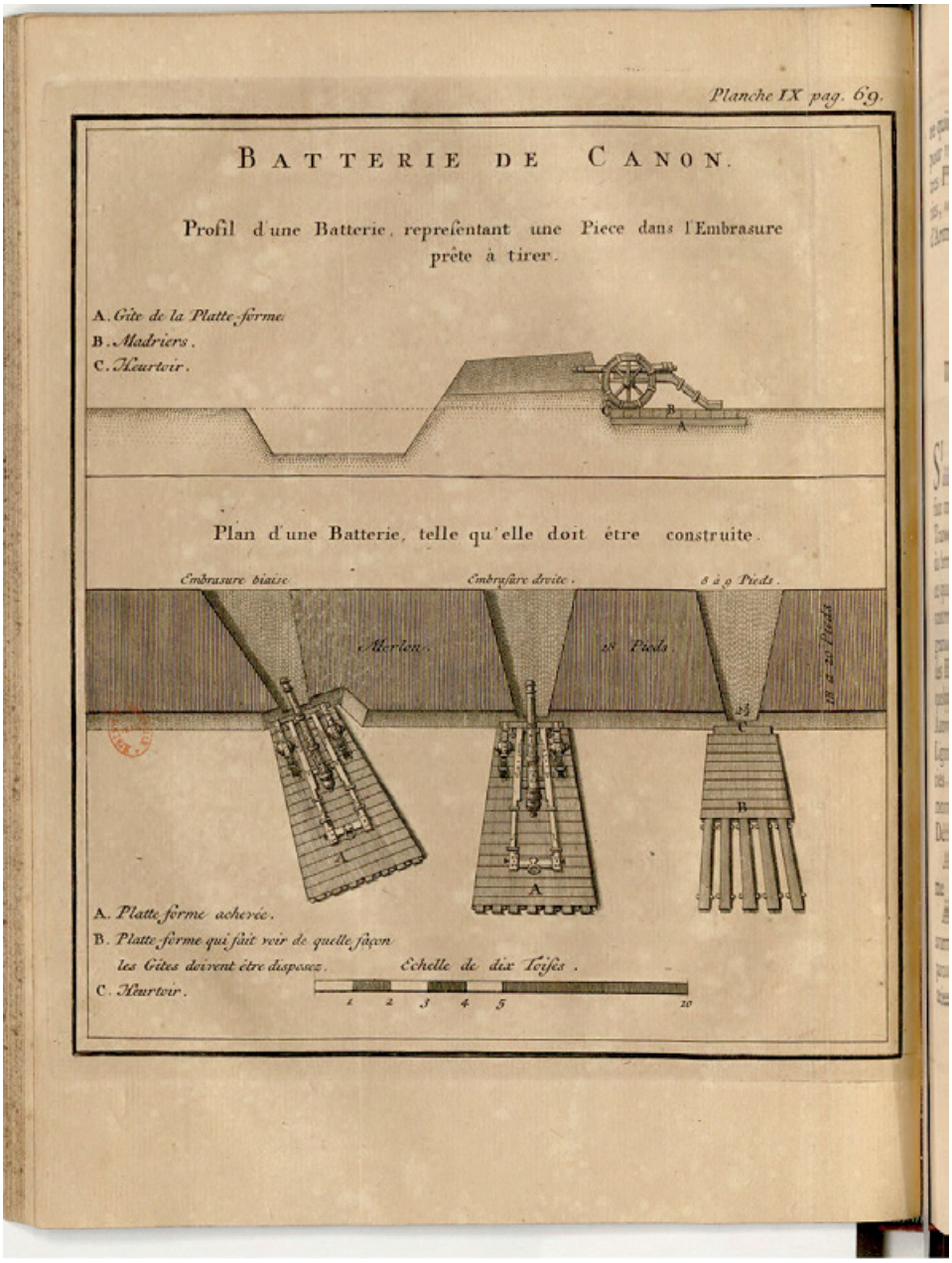


Planche IX pag. 69.
BATTERIE DE CANON.
Profil d'une Batterie, repreſentant une Piece dans l'Embrasure prête à tirer.
A. Gîte de la Platte-forme.
B. Madriers.
C. Meurtoir.
Plan d'une Batterie, telle qu'elle doit être construite.
Embrasure biaise.
Embrasure droite.
6 à 9 Pieds.
Merlon.
28 Pieds.
A. Platte-forme achevée.
B. Platte-forme qui fait voir de quelle façon les Gîtes doivent être disposez.
C. Meurtoir.
Echelle de dix Toiſes.
1 2 3 4 5 10

2 Vauban *De l'attaque et de la défense des places* : par Mr. de Vauban,... [-Tome second, *contenant un Traité pratique des mines*, par le mesme, et un autre, de la guerre en général, par un officier de distinction] | Gallica

Taktik und einige Fragen des Krieges" gave significantly more space to fortified camps. Based on examples from The Seven Years war the Saxon engineer officer Johann Gottlieb Tielke published his "*Beyträge zur Kriegs-Kunst und Geschichte des Krieges von 1756 bis 1763"* of which two English editions were printed in 1787 and 1789. The later one shifted the focus of the work in the title more to field engineering: "The field engineer: or instructions upon every branch of field fortification: Demonstrated by examples wich occurred in the Seven Years War between the Prussians, the Austrians, and the Russians; with plans and explanatory notes. Translated from the fourth edition of the German original of J.G. Tielke, Late Captain of Artillery in the service of H.S.H. the Elector of Saxony. 2 vols".

Depending on the soil and the quality of the construction (how well was the earth excavated for the rampart compacted?), earthworks offered good protection against artillery, even though the latter possessed considerable penetrating power. Vauban's investigations showed that the ball of a 24-pounder penetrated 12 feet into compacted earth at a distance of just under 100 yards, while that of a 12-pounder penetrated seven feet at 200 yards. A Prussian experiment from 1802 reported the penetration depth of a 24-pounder as 7 to 12 feet at 400 paces, 3 to 7 feet at 600 paces, and 2.5 to 6 feet at 1800 paces, and 4 to 7 feet, 3 to 6 feet, and 2.5 feet, respectively, for a 12-pounder. The experiment was conducted on loosely constructed earthworks, such as those used in field fortifications. With this knowledge in mind, Tielke demanded that fieldworks be shaped according to the size of the artillery, an enemy posseses:

> "Every work consists of a breastwork or parapet and a ditch.—The ditch is in parapet defends your troops against the fire of his artillery or small arms: Consequently, whenever the Engineers begin the foundation of a work, they ought to be aware of the number and weight of the cannon with which there is a probability of its being attacked, and to carry in their minds what I have before observed, viz. chat a shot from one to four pounds weight will penetrate good earth to the depth of four or five feet: that a shot of ix or eig pounds will penetrate from vi to seven feet: that a shot of twelve pounds will penetrate from eight to nine feet: and that a shot of twenty-four pounds will penetrate even to the depth of f.teen or sixteen feet".[27]

27 Quot.: Tielke, *The field engineer*, vol. 2, pp. 1-2.

Location is essential

A well-chosen campsite, reinforced by field fortifications, could alone prove to be an insurmountable obstacle, deterring the enemy from attacking. Frederick the Great was very satisfied with the topographical position of his camp at Bunzelwitz, characterizing its advantages afterwards:

> "The camp's greatest strength lay in the fact that it deprived the enemy of their three weapons, while the Prussians could use them to their full advantage. The attackers were initially unable to utilize their cannons effectively, as the entire area surrounding the entrenchments lay considerably lower than the fortifications, rendering the enemy artillery fire completely ineffective. Likewise, the enemy could do nothing with their cavalry; for as soon as it appeared, it would have been annihilated by the Prussian batteries. And finally, what could be achieved with small arms fire? Should one fire musket at cannons? Or could one use gunfire to flush out chevaux-de-frise and topple palisades? All of this was impossible. Certainly, however, the Prussians in this position possessed all the advantages that terrain combined with fortifications could offer one army over another. Based on these considerations, they calmly awaited the further actions of their enemies."[28]

The Saxon engineer officer Tielke was similar positive about the location and fortifications of the Prussian camp, which he called "formidable" and those "accesses […] were not insurmountable, but nevertheless quite arduous because of the small streams, marshy meadows and the batteries flanking and sweeping everywhere."[29]

In a similar fashion, the Saxon camp at Pirna in 1756 was situated on a high plateau, covered by two fortresses (Königstein and Sonnenstein near Pirna) which needed just a few additional fieldworks to keep the Prussians at bay. Small cuts on the Western flank were covered by barricades, wolf pits or artillery redoubts.[30] Frederick the Great therefore stated, "that it is indeed impossible

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28 Quot.: Werke Friedrichs des Großen, 4, p. 100.

29 Quot.: Johann Gottlieb Tielke, *Beyträge zur Kriegs-Kunst und Geschichte des Krieges von 1756 bis 1763. Mit ca. 50 Krtn. u. Pläne, Bd. 3* (Freiberg: Barthel 1777), p. 89.

30 The essential work herefor is: Marcus von Salisch: *Treue Deserteure. Das kursächsische Militär und der Siebenjährige Krieg* (Munich: Oldenbourg 2009). The camp is intensivly covered on pp. 55-137.

to attack this damned camp without sacrificing several thousand brave soldiers for a still rather uncertain goal."[31]

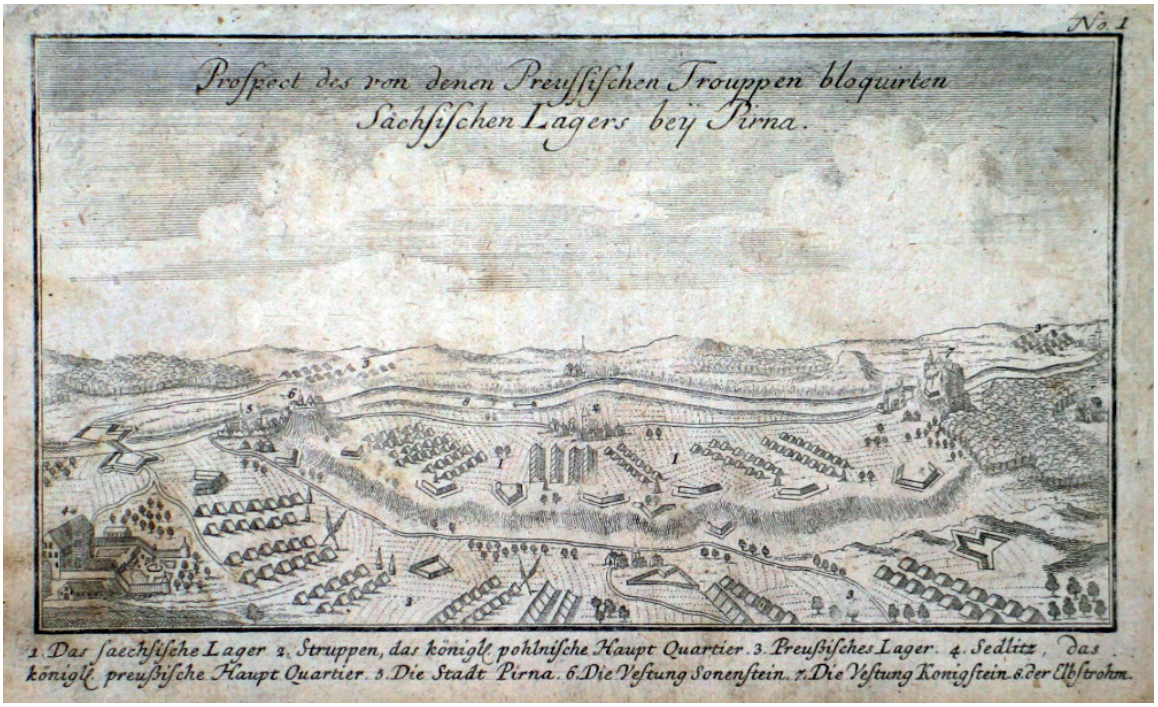
Fortified camps must not necessarily provide all around defense. In some cases, it was sufficient to block the enemy's potential main approach route. The Danish camp at Sgeberg in 1700 was situated on a plateau behind the Trave River. Although the river was largely dry during the warm summer, allowing the Swedes to cross it without major difficulty, the opposite bank featured a steep embankment, 10 to 15 meters high, along which the Danes constructed several redoubts connected by earthworks. An open flank to the west of the camp was also secured with field fortifications, and a chain of smaller outposts was built to the east. The rear of the camp, however, remained uncovered. A sweeping flanking maneuver by the Swedes would likely have been detected in time. The *Theatrum Europaeum* reports that the Swedes initially viewed the construction of the entrenchments with concern. Duke Frederick IV of Schleswig-Holstein-Gottorf (r. 1695–1702) and General Nils Gyllenstierna (1648–1722) initially decided to bombard the entrenchments while they were still under construction, "so that the Danish army would not become so entrenched that it could no longer be reached."[32] The Swedes, in turn, erected entrenchments and prepared to attack several outworks. "This attack was also thwarted by an unexpected counter-order / and shortly afterwards both sides were forbidden / not to fire a shot at each other without a special order."[33] The two armies continued to wary each other, and the Danes fortified their positions, which made perfect sense since there was no official truce and a heavy defeat in the event of a surprise attack would only further weaken their negotiating position. However, their swift withdrawal from the Great Northern War could not be prevented.

Only rarely did battles at field fortifications occur in the early modern period, and those that did quickly resulted in unusually high losses for the attacker. During the Thirty Years' War, in late summer 1632, Albrecht von Wallenstein established a fortified camp outside Nuremberg, which was held by Swedish troops. On September 3, the Swedish King Gustavus Adolphus II launched a futile attack on the „Alte Veste," the ruins of a medieval castle that the Imperial

31 Quot. after: Ibid., pp. 82-83.

32 Zit.: Theatrum Europaeum 15, S. 771.

33 Zit.: Ibid.., S. 771.


No. 1
Prospect des von denen Preussischen Trouppen blocquirten
Sächsischen Lagers bey Pirna.
1. Das saechsische Lager. 2. Struppen, das königl. pohlnische Haupt Quartier. 3. Preußisches Lager. 4. Sedlitz, das
königl. preußische Haupt Quartier. 5. Die Stadt Pirna. 6. Die Vestung Sonenstein. 7. Die Vestung Konigstein. 8. der Elbstrohm.

3 Pirna 1756 Belagerung bei Pirna Wikipedia

forces had incorporated into the fortifications of their camp near Zirndorf. The Swedes lost 1,200 men compared to 300 Imperial troops.[34] In the War of the Spanish Succession, in 1704, Anglo-Dutch-German troops stormed a camp held by 16,000 Bavarians and Frenchmen on the Schellenberg near Donauwörth, suffering 1,342 dead and 3,699 wounded.

On the other hand, a bad situated camp could become a deadly trap for an army, especially if artillery from surrounding hights could pound the position. Peter the Great had this experience two years after his victory at Poltava, when he advanced to the Prut River in a rapid campaign against the Turks, only to be surrounded by the Ottomans. Using heavy artillery, the Ottomans forced Peter into negotiations, which ultimately led to the Peace of Prut.[35] However, the for-

34 Helmut Mahr, *Wallenstein vor Nürnberg 1632. Sein Lager bei Zirndorf und die Schlacht an der Alten Veste, dargestellt durch den Plan der Gebrüder Trexel 1634* (Neustadt/Aisch: Degener 1982).

35 Akdes Nimet Kurat, ´Der Prutfeldzug und der Prutfrieden von 1711`, in: Jahrbücher für Ge-

tifications themselves constructed by the Russians proofed to be quite strong, as a coup de main by 8.000 janissaries which was not properly supported by artillery, failed.

In the American Revolutionary War, a British army was surrounded, decimated, and forced to surrender by American-French forces at Yorktown in 1781. The British commander, Lieutenant General Charles Cornwallis (1738–1805), had chosen Yorktown as an encampment because the commander-in-chief in North America, General Henry Clinton (1730–1795), had previously instructed him to secure a suitable deep-water port in the Virginia colony. Yorktown was the only viable harbor, but according to Cornwallis "far exceeds our power consistent with your plans to make safe defensive posts there and at Gloucester, both of which would be necessary for the protection of the shipping."[36] Cornwallis was well aware of the danger of encirclement and urged Clinton to send swift reinforcements, which Clinton promised but ultimately failed to do.[37]

However, if the camp was well-positioned and fortified, attackers generally shied away from assaulting it. During the War of the Bavarian Succession in 1778/79, the Austrian army was divided in two field armies which established several fortified camps in Bohemia, which the Prussians did not dare attack. The Western army close the Isar Mountains would be commanded by Loudon and consisted of 80.000 men with 250 cannons. Further to the southeast stood the Elbe army under the nominal command of the emperor and Lacy, consisting of 100.000 men and 436 guns. The passages of the mountains and all tactically important positions should be covered by redoubts, while fortified camps were constructed at Hohenelbe (Vrchlabí), Arnau (Hostinné), Jaromiersch (Jaroměř) and Smierschitz (Smiřice). Feldzeugmeister Carl Reichard Baron of Ellrichshausen (1720-1779) was in charge of the construction works. Additionally, the fortifications of Olmütz and Eger (Cheb) were improved. Joseph was yet in good mood and made daily inspections of his brigades, but kept the troops in their cantonments and had them rest. When Frederick passed the border, he found the

schichte Osteuropas. NF 10/1 (1962), pp. 13–66; Nicholas Dorell: *Peter the Great Humbled. The Russo-Ottoman War of 1711* (Solihul: Helion & Company 2018).

36 Quot. after: Middleton, *Cornwallis*, p. 92.

37 John Grainger, *The Battle of Yorktown, 1781: A reassessment* (Woodbridge: Boydell Press 2005). Regarding Cornwallis´doubts of Yorktown: Middleton, *Cornwallis*, pp. 89–93.

Austrian positions at Königgrätz well-fortified with redouts and trenches eight foot deep and 16 foot wide, supported by palisades and cheveaux-de-friese, in short "more like a fortress than like a field fortification. "The Southern bank of the Elbe river was higher than the northern one, adding to the protection of the defenders. The river itself was in flood. All Elbe crossings were defended by triple redoubts. On the wooded mountaintops the enemy had erected barricades; behind was a reserve of 40 battalions, which could quickly come to the rescue wherever the Prussians had been bold enough to venture an attack, provided they had succeeded in gradually penetrating the numerous redoubts and fortifications with their 1.500 guns to storm. The main difficulty, however, which added to all the others and made the Elbe crossing completely impossible, was this: the river bed is bordered from Jaromer to the high mountains on both banks by 12 and more foot high cliffs, which can only be crossed on the existing bridges. And it was precisely there that a lavish abundance of fortifications prevented any advance",[38] wrote Frederick in his history of the war.

In the Russian campaign of 1812, the Russian army set up a large fortified camp on the Drissa River, where it awaited an attack by Napoleon's troops. However, the Napoleonic troops decided to bypass the camp to the south. One could therefore aptly add to Frederick the Great's observation that fortified camps are prepared battlefields where fighting rarely takes place.

But stalemate is risky too

The example of the camp on the Drissa River illustrates one of several risks associated with fortified positions. If these were located at operationally insignificant points, an attacker might simply ignore them. The Prussians could afford a similar blunder in 1756 when, although they tied down part of the Saxons' troops in their camp near Pirna, they used the remainder to repel an Austrian relief effort at the Battle of Lobositz. Like any field fortification, a fortified camp is therefore only as strong as its defenders, and in this case, too, the principle applies: no fortification is impregnable. Nor is this its intended purpose. Fortifications of any kind are meant to trade space for time by forcing an attacker either to assemble large numbers of troops for an assault or at least sufficient

38 Quot.: Werke Friedrichs des Großen 5, pp.107-108.

forces to keep the encircled troops in check.

For these soldiers, their prolonged immobility could eventually become a problem. In the pre-modern era, poor hygiene and misconceptions about proper hygienic practices cost more soldiers their lives than any battle.[39] In particular, the enormous quantities of excrement produced in a bivouac, which, at least in the 16th and 17th centuries, but largely also in the 18th century, were deposited in the immediate vicinity of the camps—or, in the case of horses, certainly in large quantities within the camp itself—contributed significantly to the emergence and spread of disease. The straw with which soldiers stuffed their tents provided a welcome breeding ground for vermin, especially if it was not changed regularly. The resulting diseases posed a great threat to the survival of an army. By a rule of thumb, armies should not stay in camp for more than six weeks, before this situation decreased. Wallenstein‘s camp near Zirnstein, with approximately 55,000 men, was one of the largest of the early modern period. Exact figures are unknown, but it is estimated that several thousand men died in about six weeks.

The Saxon troops‘ surrender at Pirna was primarily due to depleted supplies. Due to the hasty concentration of troops following the surprise Prussian attack, only a month‘s supply of hard fodder and four days‘ worth of bread could be brought to the camp, supplemented by a hastily hauled 100 bushels of oats and grain from Dresden storehouses. However, on October 10th—news of the repulsion of the Austrian relief corps at Lobositz having by then reached Saxon headquarters—the Privy War Counciler, responsible for supplying the army, reported that supplying the troops beyond October 12th would be impossible. Despite its size, the high plateau was sparsely populated, and there were hardly any villages from which the troops could obtain provisions. Moreover, despite being bordered by the Elbe and the Gottleuba rivers at the foot of the plateau, there was a lack of water sources on top of it. The army attempted one last, desperate breakout, but when this was repulsed by the Prussians, they had no choice but to lay down their arms.[40]

39 Pádraig Lenihan: Fluxes, *Fevers and Fighting Men. War and Disease in Ancien Regime Europe 1648–1789* (= From Reason to Revolution 33) (Solihull: Helion & Company 2019).

40 Salisch: *Treue Deserteure*, pp. 65, 110-111.

4 Yorktown 1781 Siege d'York, 1781. Plan d'York en Virginie avec les attaques et les campemens de l'Armée combinée de France et d'Amérique. LOC gm71002176.jpg (7672×5654)

The Danes faced very similar problems in the summer of 1700, while the Swedish army benefited from provisions deliveries from nearby Lübeck, "as the provisions and bread wagons, with proper escort, went back and forth almost daily, and other superfluous supplies were delivered."[41]

Conclusions

The warfare of the Ancien Régime was in many respects more complex than

41 Quot.: Theatrum Europaeum, p. 771.

research still acknowledges. Two important principles, however, can be identified: 1) the desire to make warfare predictable, which was also connected to Baroque concepts of order, and 2) the positioning of field armies in such a way as to minimize the risk of battle, which was particularly high due to communication-related frictions. The construction of fortified camps served both purposes by positioning an army in pre-built defensive structures, thus facilitating communication—since the position of units was known and did not easily change on the battlefield—and increasing their defensive capabilities. For precisely this reason, an enemy was often reluctant to attack such positions.

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Fortification in British Imperial History

by Jeremy Black

Empires always have to confront fortification. They do not necessarily focus on building fortresses, as the Mongols clearly showed. But, at the very least, empires had to confront and overcome the challenge of existing ones in order to establish their power, which was certainly the case repeatedly for the Mongols in thirteenth-century China. The British empire shared in the more standard pattern of capturing fortresses in order to establish empire, notably in Canada (from the French) and India (from the French and from Indian rulers), and building, garrisoning and defending fortresses in order to anchor their imperial presence. This indeed provides a standard history for the subject, as seen from any account beginning with medieval castle-building, notably in north Wales from the late thirteenth century, and continuing to the hasty defences put up in 1940 to protect against the prospect of an apparently imminent German invasion.

For contemporaries there was an alternative account, sometimes supplementary but frequently presented as making a standing army unnecessary as well as unwelcome, that of the 'wooden walls' of the Royal Navy which was the world's largest navy from the mid-1690s till toward the end of World War Two. Moreover, that defence was regarded as more benign than fortifications because it did not require large garrisons that might serve autocratic political purposes and that had high construction costs.

There was also a sense of historical validation and Providential purpose underlying the reliance on the navy, with important victories against invasion fleets, as in 1216, 1588, 1692, 1759 and 1805, supported by the winds that revealed Providential purpose, notably in 1588 (while, in contrast, supporting a Protestant invasion under William III of Orange in 1688). This was an account also seen elsewhere, especially in Japan in response to unsuccessful Mongol/Chinese invasion attempts in the thirteenth century. Morality was always important to strategy. Yet, in practice, this navalist approach was inadequate as a pro-

spectus for past strategy, just, separately, as it also is insufficient as a scholarly analysis of the past history of fortification in imperial Britain.

The imperial history of Britain includes that of all or part of Britain as part of the empire of another power or ruler. This position did not have to lead to imperial fortification plans, as the Danish empire of Cnut and his sons in 1016-42 demonstrated. However, the situation was very different under the Romans who were in control of much of Britain from 43 to 409. Fortification served them both to protect positions and frontiers, a pattern that remains true, albeit with very different technologies and contexts, as in the fortified police stations and the (attempted) border controls of the present. The most famous fortified structure in British history indeed is Hadrian's Wall, one now very much part of the national heritage as shown by the controversy in 2025 over the cutting down of a famed tree there. The construction of forts on 'the Saxon Shore' showed Roman adaptability to new threats.

There was also fortification by a state that can be seen as imperial England and, subsequently, Britain. This can be begun with the consolidation and expansion of Wessex from the late ninth century and its transformation into the Old English monarchy notably, in fortification terms, with the system of *burhs*, or fortified towns. Subsequently, consolidation and expansion were the case with the Anglo-Norman state and its medieval successors, not least as frontiers of expansion were advanced and defended in northern England, Wales, Ireland and towards Scotland. Thus, the Norman position in northern England was established in the late eleventh century not with a wall or line of forts, but with castles, especially at Durham, Newcastle and Carlisle, each of which became a centre of government. The second most famous fortified structure for Britain is the Tower of London, which was begun by William I (r. 1066-87), 'the Conqueror'; albeit with the Scots preferring Edinburgh Castle.

The fifteenth and sixteenth centuries saw new needs for defence in the face of a resurgent France following the total English defeat in France in the early 1450s in the last stage of the Hundred Years' War (1337-1453). Subsequently, this need for fortification, both for defence and to protect offensive positions, was also so as a consequence of the revival of the British question, with France replaying the Scottish alliance card it had earlier used from the 1290s. Furthermore, the security crisis of the Protestant Reformation that began for England

in the late 1530s was swiftly expanded by Spanish support for opposition in Ireland as well as French support for opposition in Scotland.

There were also the technological, tactical and organisational changes arising from the development and deployment of artillery on land and sea, as seen in the increased usage of artillery in the sieges of Calais, by the English (successful) in 1346-7 and the French (unsuccessful) in 1436.[1] Fighting in France, the English from 1415-17 and the French in 1429, both had impressive artillery trains. The English deployed 71 cannon in 1428 for what became their unsuccessful siege of Orléans.[2] As a result of this capability, earth and timber outworks were added to fortresses to keep besiegers from running their cannon close to the walls.

The French cannon proved particularly important in the rapid conquest of English-held Normandy in 1449-50, and if other factors, such as the weakness of the divided English, played a significant part, the sense of inevitability coming from French strength and success was also important. In 1450, the Bureau brothers deployed the cannon in the successful French siege of the key fortified port of Cherbourg on the sands so that they could cover its facing wall. Covered in tarpaulins, the cannon were left in place when the tide came in, only to be ready for reuse when the tide receded.[3]

This usage reflected the relatively simplistic nature of artillery specifications, and the tolerances of changing physical circumstances that could exist as a consequence. The weakness of even the strongest fortification was shown in the most serious failure of an English fortress in the period, that of Calais (held since 1347) in 1558, one due to the overwhelming strength and speed of the winter attack by the French. Relief by sea proved impossible because of the weather.

The alliance, twenty years earlier, between the Emperor Charles V (ruler, among much else, of the Low Countries and Spain) and Francis I of France trig-

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1 I would like to thank David Flintham for commenting on an earlier draft.
P. Purton, *A History of the Late Medieval Siege, 1250-1500* (Woodbridge, 2010), p. 405.

2 K. DeVries, 'The Use of Gunpowder Weaponry by and against Joan of Arc during the Hundred Years' War,' *War and Society*, 14 (1996), pp. 1-15; A. Curry, 'Guns and Goddams. Was there a Military Revolution in Lancastrian Normandy, 1415-1450?,' *Journal of Medieval Military History*, 8 (2010), pp. 171-88; D. Spencer, 'The Provision of Artillery for the 1428 Expedition to France,' *Ibid*., 13 (2015), pp. 179-92.

3 H. Dubled, 'L'artillerie royale française à l'époque de Charles VII et au début du règne de Louis XI, 1437-1469: les frères Bureau,' *Mémorial de l'artillerie française*, 50 (1976), pp. 555-637.

gered invasion fears in England and resulted in an information-led programme of defence. In 1539, Henry VIII's leading minister, Thomas Cromwell, ordered a survey of the coast to advise on risks and necessary fortifications – information that was sent to Court in the form of sketch plans and text which were compiled into maps. The resulting decisions led to the buildings of a series of forts, as well as to improvements elsewhere, for example the addition of Moat Bulwark to the defences of Dover, a heavily-defended site, and one that remained so into the twentieth century. There was also a focus under Henry VIII on the navy. The combination of naval strength, fortification and army preparedness in defence of Britain, as well as the search for Continental allies as an aspect of forward defence seen in the eighteenth and nineteenth centuries, had a long history.

In contrast, and the process of neglect, decay and abandonment are very much part of the history of fortifications, heavily-castellated parts of the country, such as northern England, saw widespread 'defortification' from the sixteenth century. Wales had been heavily fortified in the thirteenth and fourteenth centuries, and these fortresses played a major role in the eventually-successful resistance to the rebellion by Owain Glyndŵr (Owen Glendower) against Henry IV in 1400-c.1415. However, the suppression of that revolt ended Welsh attempts at independence and many of the castles that had anchored English control in the late thirteenth century were abandoned or, as with Beaumaris (which was never completed) and Conwy, fell into disrepair. Others were enhanced, not with fortifications, but with comfortable and splendid internal 'spaces', especially long galleries, as happened at Raglan, Powis and Carew.

In the event, some of the castles, such as Chepstow, Harlech and Pembroke, were to be used in the civil wars of the 1640s. They fell to attack, but, conversely, achieved their purpose of engaging, fixing and delaying attacking forces. That apparent contrast is a key one in the history of fortification and one that greatly complicates assessments of effectiveness and, therefore, capability, for it underlines the degree of agency enjoyed by the attacker.

The defensive strand in Tudor fortification, seen with Henry VIII's work on the south coast and Elizabeth I's work, notably, but not only, at Berwick (as well as the offensive siege of Leith in Scotland in 1560), was followed in the seventeenth century by renewed signs of vulnerability, most dramatically invasions of England by armies from Scotland, in 1640, 1644, 1648, 1651 and 1660. Those

in 1648 and 1651 were stopped by defeat, in battles at Preston and Worcester respectively, but not the others. Fortifications had failed to deter or block all these invasions.

This indeed happened anew in 1745, when Carlisle rapidly fell to the Jacobites when Charles Edward Stuart, the Jacobite commander invaded England. When he retreated into Scotland, after abandoning his advance into England at Derby that December, he left a garrison of 350 men in Carlisle Castle, a medieval castle, in order to show a determination to return to England and to avoid the necessity of besieging the frontier city on his return. It was also hoped that such a force would delay the pursuit by William, Duke of Cumberland. The defenders, who had only ten cannon, sought to strengthen the defences with ramparts and iron spikes, and burned down houses that might cover the attackers.

Arriving on 21 December 1745, Cumberland described the castle as 'an old hen-coop, which he would speedily bring down about their ears, when he should have got artillery.'[4] He summoned cannon from the port of Whitehaven, had batteries constructed for them and blockaded the defenders, cutting off their water supply, the last a traditional practice. The siege was not without its problems from 'the wetness of the season, which makes it difficult to raise the earth, the badness of the ways for conveying the artillery, the want of engineers, ammunition etc.'[5] On 27 December, however, the cannon arrived and their superior firepower doomed the defenders:

> 'A battery of six eighteen-pounders was perfected the 27th at night, and on Saturday was fixed with good success, but the shot failed a little so that the fire was slacker on Sunday. However, this little loss of time was of no consequence as a supply is received which will be continued as far as there is occasion; and the battery was augmented that night. Overtures for a surrender were made Saturday night and again on Sunday night, but his R.H. [Royal Highness, Cumberland] would not hearken to anything.'[6]

Cumberland set the match to the first cannon himself, a symbolically im-

4 John Waugh, *Carlisle in 1745: Authentic Account of the Occupation of Carlisle in 1745 by Prince Charles Edward Stuart,* edited by G.G. Mounsey (London, 1846), p. 149.

5 Colonel Joseph Yorke to his father, Philip, Lord Chancellor Hardwicke, Dec. 24, 1745, in Philip Yorke, ed., *The Life and Correspondence of Philip Yorke, Lord Chancellor Hardwicke*, 3 vols., (Cambridge, 1913), I, 488.

6 Northumberland CRO, ZRI 27/4/50b; Windsor Castle, Royal Archives, Cumberland Papers (hereafter RA), 8/89, 109, 152, 161.

portant step directly linking him with the artillery, and his cannon reputedly fired over 1,100 shots on the 28th. The totally outgunned defenders saw their fortifications battered and the walls breached in two places, breaching being a difficult-to-avoid consequence of repeated blows from iron cannonballs on particular spots. The defenders surrendered on the 30th, unable to obtain any terms other than the promise that they should not be put to the sword, but be reserved for the royal pleasure. Cumberland reported, 'I wish I could have blooded the soldiers with these villains but it would have cost us many a brave man, and it comes to the same end, as they have no sort of claim to the King's mercy.'[7] Many were hanged for treason.

Superior firepower was a requirement, as shown, in a different context, when the outgunned Jacobites besieged Stirling Castle, another medieval fortification, indeed one that had been crucial to the Bannockburn campaign of 1314. An unsympathetic townsman recorded on 26 January 1746: 'great firing from the trenches upon the castle with small arms, from nine in the morning till six at night, without any execution.' On the 28th, the Jacobites finished their battery, but when, the following morning, they began to fire their three cannon at the castle, the defenders replied with thirteen cannon which 'dismounted their guns … broke their carriages and levelled their trenches in a sad manner, and a great number of them killed.'[8] The siege was abandoned.

Similarly, in March 1746, the Jacobites besieged Blair Castle. As they only had two 4-pounders, one of which was inaccurate, and nobody trained in undermining fortifications, the seven-foot thick walls were impregnable. An attempt to starve the garrison into surrender did not succeed before a relief force arrived, the last a key element in sieges, and one absent for the Jacobites when defending Carlisle in December 1745.

In contrast to Blair Castle, Fort Augustus was also attacked by the Jacobites in March 1746, and it surrendered after a siege of only two days and the explosion of the defenders' magazine. The Jacobites there pressed on to attack Fort William. However, Grant, their siege engineer, who had been so successful at Fort Augustus, was killed by a cannon-ball, which was a particular risk to those

7 RA. 8/161.

8 Robert Chambers, ed., *Jacobite Memoirs of the Rebellion of 1745* (Edinburgh: William and Robert Chambers, 1834), pp. 98-99.

engaged in siegecraft, and his French replacement proved incompetent. The defence was helped by having enough supplies as well as a determined commander and was stronger than that at Fort Augustus. A sally by the garrison destroyed the Jacobite batteries, leading the Jacobites to abandon the siege. Morale fell, desertion rose, and Charles Edward Stuart was obliged to retreat, abandoning his cannon. He had lost the fortress conflict, before his final and total battlefield defeat at Culloden on 16 April. This loss restricted his options, not least in the face of any defeat in the field, even had it been far less serious than Culloden.

Conversely, battles, by ending the chance of relief, could readily lead to the surrender of besieged positions: thus London did not mount a long defence after Hastings in 1066, the English garrison at Stirling surrendered in 1314 after Edward II's defeat at nearby Bannockburn, Edward IV's victories at Barnet and Tewkesbury proved crucial in 1471 and Royalist York surrendered after defeat at nearby Marston Moor in 1644.

Fortifications were important in the civil wars, especially in forcing siege, as at Exeter in 1643 and 1645, Colchester in 1648, and Carlisle twice in 1745. These sieges were all successful, while Bristol was stormed by the Royalists in 1643. However, in the civil war of 1642-6, Gloucester, Taunton, Hull, Lyme Regis and Plymouth held off Royalist sieges. Moreover, fortification could have a deterrent effect or a fixing one, in that attackers felt obliged to mount a blockade at the least. In the case of Plymouth, that also failed as the garrison was able to mount a vigorous defence. Like London in this conflict, Plymouth was protected not only by its established walls but also by a modern series of fortifications, constructed essentially of packed earth, that were designed to keep the Royalists away from the older walls, which would have been vulnerable to cannon fire.

At the same time, 'traditional' walls posed a problem. Thus, the successful siege of Royalist-held Pontefract of 1649 saw great difficulties in dealing with the thick walls of the castle, but greater success in forcing the defenders to move their cannon from the walls.[9] In other words, the anti-personnel dimension, now in the form of counterbattery fire, was more significant than the structural-damage dimension. To a degree, this continued the situation in much medieval pre-cannon warfare. Research at Chester has demonstrated the effectiveness of

9 S. Bull, *The Furie of the Ordinance: Artillery in the English Civil War* (Woodbridge, 2008); N. Lipscombe, *The English Civil War* (Oxford, 2020), pp. 308-10.

the Roman/medieval walls in resisting the impact of cannon balls. This has been put down to the fact that these walls were not solid masonry, and, instead, had a gravel/clay core which in effect created a 'spongy wall'. Such walls were more effective (but not completely so) at stopping cannon balls than the solid masonry walls at places like Constantinople.[10]

Castles were major sites of local control, providing good bases for garrisons. Thus, Banbury Castle was refortified and established as a garrison to protect the nearby Royalist capital at Oxford from attack from the north, while Hartlebury and Dudley Castles were major sites in Worcestershire, and, in turn, the Parliamentary garrison in Warwick Castle dominated Warwickshire.

The use of fortifications in the Civil Wars encouraged their 'slighting' or destruction in whole or part, a long-established practice. This was seen for example at Pontefract in 1649 and with the demolition of Bristol Castle in 1656.[11] The restored Royalists continued this practice in the 1660s, in part a response to the small size of the army but also as both security and revenge against Parliamentary towns. Thus, the defences of Gloucester and Northampton were demolished. During the Exclusion Crisis, Charles II left London for Oxford in 1681, rather than trying to contest the capital; but the military dimension to the crisis was very different (and far less serious) to that in 1641-2.

Meanwhile, fortifications could fail against foreign enemies, as with the Dutch raid on the Medway in 1667, one in which English warships were destroyed, captured or scuttled. Garrison Point Fort was abandoned in the face of a Dutch landing, the defensive chain on the Medway at Gillingham broken by a landing party of Dutch engineers, and defensive fire from Upnor Castle and shore batteries failed to stop the Dutch. That was a humiliating disaster, one depicted in Willem Schellinks' painting 'Battle of Medway' which shows a fort totally ablaze. The defence of the Thames was left reliant on blockships and fire-

10 S. Chadwick, 'Physics and the Tactical Significance of Artillery in the English Civil Wars', talk to the *Fortress Study Group*, 29 Sept. 2021. See also S. Bull, *'"The Furie of the Ordnance": Artillery in the English Civil Wars* (Woodbridge, 2008); R. Israel, 'The role of the fortifications in Gloucester during the English Civil War 1642-51. Strategic or Suppression?' (Bristol University, undergraduate dissertation, 2009) and *Cannon Played from the Great Fort: Sieges in the Severn Valley in the English Civil War* (Warwick, 2021).

11 L. Rakoczy, *Archaeology of Destruction: a Reinterpretation of Castle Slightings in the English Civil War* (PhD, York, 2007).

ships, although Landguard Fort near Harwich successfully resisted Dutch attack.

The humiliation of 1667 was a strategic disaster that helped to lead to an unsatisfactory end to the Second Anglo-Dutch War, one that contrasted to the First Anglo-Dutch War, that of 1652-4. That disaster, nevertheless, was nothing compared to the total failure of the national defence in 1688 when William III of Orange invaded England successfully. That failure, however, was to be absorbed into the national myth by being presented as a liberation. Furthermore, the Dutch invasion force, which landed in Devon, did not have to engage with English fortresses, nor indeed an army; although the situation was to be different subsequently in Scotland and, far more, Ireland. In 1689-91, sieges of Londonderry, Athlone and Limerick each played a very significant role in the campaigning in Ireland; although, due to William's victory at the Boyne in 1690 there was no need for him to besiege nearby Dublin.

In 1719, Spain planned an invasion, Giulio Alberoni, the leading minister, noting: 'in order to prevent a landing it is necessary to have ships and they take time to arm … the British coast is too long to defend effectively.'[12] Moreover, it was difficult for the British to find and intercept invasion fleets once they had moved away from shore, a situation which led to rumours and uncertainty.[13] In the event, far from having to rely on fortifications in the event of naval weaknesses, the British benefited in 1719 from a storm that hit and dispersed the main invasion fleet. So also in 1744 in the face of a French invasion attempt of England, and in 1796 in the case of Ireland.

In turn, in 1719, a British expedition was ordered to attack Corunna, a key Spanish naval base, as seen in 1588 with the Armada; but, judging it too strong instead captured Vigo and Pontevedra, destroying the military stores accumulated there.[14] This was a forward defence against invasion comparable to Elizabethan attacks on Spanish ports.

Fortifications continued important, so that in the international crisis of 1727

12 Oxford, Bodleian Library, Ms. French e20, pp. 1, 41-9.

13 James Craggs, Secretary of State for the Southern Department, to John, 2nd Earl of Stair, envoy in Paris, 2, 9, 16 Ap. 1719, London, National Archives (hereafter NA), State Papers 104/30.

14 Craggs to Henry Worsley, envoy in Lisbon, 22 Sept., 20 Oct., 9 Nov. 1717, London, British Library (hereafter BL.) Additional Manuscripts, 15936 f. 256, 265, 270.

the Spaniards unsuccessfully besieged Gibraltar and the British blockaded Veracruz, the key silver port in Mexico. The British pressed that year for the seizure of the Rhine crossing-point of Rheinfels by their ally France in the event of war so as to be able to deploy French troops in Germany to counteract Austrian and Prussian threats to Hanover.[15] In the event, there was no war that year.

The subsequent strategic position of British fortification focused largely on defence from invasion, and notably so after the British question in its Jacobite iteration, with the risk of rebellion, ceased to be a threat in the mid-eighteenth century. However, fortification against insurrection remained an issue in Ireland, as seen in the defences of Dublin Castle, which, indeed, was the focus of an abortive rising in 1803. In the rebellion of 1798, the garrison at Naas defeated a rebel attack and rebel attempts to storm New Ross, Antrim Town and Portaferry. In effect, defended towns were fortified positions.

Yet, in Ireland, the defence of empire rested largely not on fortifications, but on the garrison of troops and on supporting volunteer forces, as seen when the crisis of 1798, one of rebellion and French invasion, was overcome. At Vinegar Hill, the rebels fought from their positions which left them vulnerable to British artillery. They had not had time to fortify their camp significantly and were dependent, instead, on their numbers and the height of the position. In Ireland, fortifications were largely a matter of garrison-bases, the protective features of which varied greatly in their seriousness, maintenance, and potential lethality.

Protection against the invasion of England, Scotland and Wales was essentially a matter of home defence forces as a second line to the navy, as in 1779 and 1805, and indeed 1588. Military encampments, as near Amersham, Doncaster and Salisbury in 1757, at Warley, Coxheath and near Salisbury in 1778-9, on Bagshot Heath in 1792, and at Brighton in 1793-4, were not fortified. Instead, they were located with an emphasis on road links, for access to the coast was a key element.

There was no programme of fortress construction to cover potential landing places until the greater challenge from France in the 1800s under Napoleon led to the construction of Martello Towers: from 1804, 103 were built along the south coast, from Seaford in Sussex to Aldeburgh in Suffolk, three in Scotland

15 Marquis de Vogüé (ed.), *Mémoires du maréchal de Villars* (6 vols, Paris, 1884-1904), V, 67.

and several in Wales, under the influence of the impressive defence of the Torra di Mortella on Corsica against British forces in 1794. This was an instance of the need to find a new defensive model to confront a different task, that of rapid construction on many sites. In contrast, the mighty Berry Head fortifications were constructed to the east of Brixham between 1794 and 1804, and the impressive Western Defences above Dover, while the defensive lines around Plymouth Dock were reconstructed in 1801-6.[16]

Although intended as force-multipliers, these defences required significant numbers of troops and cannon, which lessened those available for deployment abroad or for a mobile reserve at home. This was always an issue with fortification: it benefited defence as a force multiplier, but also was a source of problems. Yet, such fortifications could also prove a rallying point for volunteers and militia in the event of need.

These defensive fortifications were separate to a specific pattern of defence need, that of the protection of naval bases, for one of the major weaknesses of anchorages and the related stores was to attack from amphibious forces landed nearby, as by the British successfully at Vigo in 1702. In contrast, Lisbon was not captured by the English in 1589, nor La Rochelle relieved in 1626-7, while Toulon held off Allied sieges in 1707 and 1746.

Landguard Fort, which was designed to protect the mouth of the River Orwell, and thereby the port of Harwich, a fort begun in 1540 and improved from 1621, was enhanced in 1717 and 1732, while a new fort on an adjoining site was begun in 1745 with pentagonal bastions, and new batteries added in the 1750s, 1780s and from 1804. Essex was seen as an invasion risk, as a French force, not needing to cross the defensive possibilities of the Weald, South and North Downs, and River Thames, could be sent there from Dunkirk. That was a port that was difficult to blockade successfully, as the French had shown in 1708 when attempting an invasion of Scotland.[17] In 1743-5, the Jacobites indeed pressed for a landing at Maldon, which was considered by the French in 1746.

16 M. Duffy, 'Coastal Defences and Garrisons, 1480-1914,' in R. Kain and W. Ravenhill (eds), *Historical Atlas of South-West England* (Exeter, 1999), pp. 161-2; R.G. Glover, *Britain at Bay: Defence Against Bonaparte, 1803-14* (London, 1973).

17 J.S. Gibson, *Playing the Scottish Card: The Franco-Jacobite Invasion of 1708* (Edinburgh, 1988).

In Scotland, invasion concerns helped lead to the building of the expensive Fort George at Ardersier Point near Inverness from 1749.

The key element was that all the fortifications were in state hands, and not private ones. Indeed, from the mid-seventeenth century, the role of providing fortifications would be a state monopoly, one also effectively seen with the ownership of cannon. The state chose to invest in only a very few strong buildings, which matched the manpower availability from a relatively small standing army, as well as the concentration of naval resources. Conversely, a larger army would have required more stores for its arms and they would have been fortified.

The combination abroad of fortresses and fleets provided Britain with tactical, operational and strategic advantage, as repeatedly seen with Gibraltar after it was captured in 1704. Fortresses were linked to ports, which had to be protected, while the fortresses could be supplied and, if necessary, relieved by sea, as happened with Gibraltar, notably in the Wars of the Spanish Succession and American Independence, but conspicuously not with Minorca in 1756, or indeed in the War of American Independence and the French Revolutionary War. So with positions such as Charles Fort, Barbados, and James Fort, Gambia. In West Africa, cannon drove off Dahomey forces that attacked the fort at Glehue in 1728.[18] This pattern continued into the nineteenth century, as seen with the improvements to Gibraltar, and the fortification of the major North Atlantic naval base, Halifax, as well as those around Portsmouth and Plymouth.

In contrast, centres of government in England were not really fortified. Thus, of medieval castles, Dover was improved as a defensive site and given a role in planning against French invasion; but the Tower of London was generally of lesser significance. However, under the direction of Inigo Jones, the roof of the White Tower was strengthened to take cannon just prior to the outbreak of the Civil War. Furthermore, during this conflict, the opposing capitals, London and Oxford, were both fortified. Oxford was subject to siege before it fell in 1646. In London, the role of the Tower might have been highly significant in 1745 had a Jacobite army advanced as it lacked much artillery. In 1780, during the Gordon Riots, and 1848, during the Chartist demonstrations, the Tower came into play in London.

18 R. Law, '"Here is no resisting the country." The realities of power in Afro-European relations on the West African "Slave Coast",' *Itinerario*, 18 (1994), pp. 55-6.

However, ultimately, 'field forces' of army (as in protecting London and Oxford) during the Civil War, and, later, police, were crucial, as has remained the case until the present, as in the successful use of large numbers of police against the coal miners' strike in 1984-5. The response to this need for 'field forces' was in part seen in the move to introduce policing in the nineteenth century. That lessened reliance on the army.

At least, old fortifications could play a role, as was shown in Paris in 1789-92, with the Bastille offering a (short-term) defensive capability in 1789, that was lacking in Versailles (1789) and the Tuileries (1792). So also with England during the Civil Wars of the 1640s, and presumably again had these been repeated in the eighteenth century. In 1745, Carlisle Castle fell, first to the Jacobites and then to the Duke of Cumberland, whereas there was no such defence in Preston or Manchester or Derby. As a consequence, the British army lacked a network of bases that could provide shelter and replenish supplies. However, the fortified nature of both Berwick and Newcastle would have done so had the Jacobites advanced south by moving east of the Pennines; which may well have been responsible for their decision not to do so. As so often, given the nature of the documentation, strategic, operational and tactical planning is a matter of speculation. The Jacobite advance was too rapid to see a resort by their opponents to the field fortifications successfully employed by the Austrians in blocking Prussian advances in the War of the Bavarian Succession in 1778-9, although that success also owed much to Austrian troop numbers and to the terrain.

It is easy to see the British empire as militarised, a theme recently pushed to the fore in discussion of the role of army and navy in imperial governance.[19] This was especially so of fortress colonies, notably Gibraltar, Minorca, and Halifax-based Nova Scotia. Indeed, as a result, fortresses can be seen as the third point of the triad, and notably so in the Caribbean where there was a very extensive pattern of fortification, for example on Barbados, while in Gibraltar and Minorca existing Spanish fortifications were greatly strengthened.

Yet, as in England, the lack of fortified centres of government was an issue in the Thirteen Colonies that successfully rebelled in 1775-6, forcing out the royal

19 G. Plank, *Rebellion and Savagery: The Jacobite Rising of 1745 and the British Empire* (Philadelphia, Penn., 2006); S. Kinkel, *Disciplining the Empire: Politics, Governance, and the Rise of the British Navy* (Cambridge, Mass., 2018).

governors. They lacked bases comparable to centres of government that had been Bourbon. This was notably so of Quebec, which was able to resist American Patriot siege successfully in 1775-6, Mobile and Pensacola, which fell only after successful sieges in 1780 and 1781 respectively, and St Augustine, which was not besieged. Yet, once taken by the British, in 1776, 1778 and 1780 respectively, New York, Savannah and Charleston proved significant and defensible positions. In 1779, the British fortifications of Savannah were well and successfully handled against an attack by far stronger French and Patriot forces.

British naval support led to the relief of Quebec in 1776, when besieged by the Patriots (as in 1760 when besieged by the French having been lost by them the previous year). However, this support was fatally lacking when the French successfully took Fort St Philip on Minorca (a still-impressive fort built in the 1550s) in 1756 and 1782, and the Spaniards Pensacola in 1782. This was an instance of a weakness for fortifications arising from the lack of a naval presence, a point more generally seen in the Caribbean. Yet, fortifications were intended not for infinite defence but rather to provide the opportunity for relief, a situation that made Admiral Byng's failure to relieve Minorca in 1756 so contentious.

Naval strength also enabled the British to attack fortified positions with success, for example Louisbourg on Cape Breton Island in 1745 and 1758. The latter attack saw an effective bombardment in which the walls were breached. This was very different to the situation at Quebec in 1759, where the navy essentially transported the troops and there was no breaching but rather a battle outside the walls. At Charleston in 1780, the navy played a greater role in its capture, but the army siegeworks and bombardment were crucial, as had also been the case in capturing Havana, the key Spanish position on Cuba, in 1762. The British ability to deploy cannon to attack Havana reflected amphibious power-projection, but, again, it was necessary to storm defence positions, in this case the breach that had been made at Fort Moro:

> 'Our new batteries against the town being perfected (which consisted of forty-four pieces of cannon) we all at once, by a signal, opened them and did prodigious execution. Our artillery was so well served and the fire so excessively heavy and incessant … that the Spaniards could not possibly stand up to their guns.'[20]

20 Francis to Jeremy Browne, 26 Oct. 1762, BL. RP. 3284.

Away from the sea, the situation was different as garrisons could have to rest on their own effort, with relief more problematic. That, however, did not make fortresses valueless for they were tactically significant and altered the operational and strategic situation. They were a presence and narrowed the frontiers in the sense of restricting opportunities for the attacker. Moreover, the best forts required attacks by units supported by cannon, implying larger, if not regular, forces and more logistical support. Thus, in 1757, the French brought 30 cannon, which had to be dragged overland in order to attack Fort William Henry which the British had built in 1755 in order to provide a forward base against French-held Canada on the Lake Champlain-Hudson Valley corridor. The very ability to project force led to the fall of the fort, which, with no hope of relief, rapidly surrendered.

So also to the advantage of the British, where, for example, the rapid breaching in India of the walls of Chetteput in 1760 or of Ahmadabad in 1780 demonstrated the effectiveness of artillery attacks. In the latter case, the British arrived on 10 February, and, on the 12th, established a battery for three 18-pounders and two howitzers within 350 yards of the wall. The defenders 'attempted to disturb the workmen with some small pieces of artillery from towers on the walls but these were soon silenced by 2 long six-pounders sent down with the covering party,' a classic instance of counter-battery usage. By the evening of the 13th, the cannon had battered a breach 100 yards wide 'besides the defences taken off for a considerable distance to the right and left'; by the evening of the 14th, a level breach 150 yards wide had been made. The fortress was then successfully stormed on the 15th.[21]

In 1799, in turn, the well-defended Mysore capital at Seringapatam was stormed after British cannon on the opposite bank of the River Cauvery blew two breaches in the ramparts. The British artillery there was divided between breaching batteries, those designed to 'take off the defences', and those intended 'to favour the assaults,' as well as one battery to 'fire upon the enemy's entrenchments.' This reflected a well-planned use of artillery, one that looked toward British usage during the French Revolutionary and Napoleonic Wars. In the case of Seringapatam, the infantry had then to storm the defences, which

21 BL. India Offce papers, Mss. Eur. Orme 197, pp. 95-100.

they did successfully, and Tipu Sultan, the Mysore ruler, was killed in the unsuccessful defence.

Charles, 2nd Earl Cornwallis, the British Commander-in-Chief in India, had observed in 1791:

> 'We can only be said to be as nearly independent of contingencies, as can be expected in war, when we are possessed of a complete battering train, and can move it with the army; and whilst we carry a large stock of provisions with us, that ample magazines shall be lodged in strong places in our rear and at no great distance from the scene of our intended operations… I hope that by a systematic activity and vigour, we shall be able to obtain decided advantage over our enemy before the commencement of the ensuing rains.'[22]

In the Carnatic in South-East India, the British were able to benefit from the seaborne movement of artillery, notably in successfully besieging the French base of Pondicherry, as in 1761, 1778 and 1793. In contrast, within the interior of India, where this option did not pertain, there were, nevertheless, numerous oxen able to move cannon, a long-established pattern of moving them, and the British also had plentiful funds with which to arrange payment. The hiring of draught animals was an aspect of the military labour market that the British found relatively easy to operate.

Forts certainly offered targets and required regular garrisons, but they could resist sieges or require such a large effort that they lessened the more general options for the attacker. Built by the French in 1701 and surrendered to the British in 1760, Fort Pontchartrain, the fort at Detroit, saw off a Native American siege in 1763, while in 1778 an American plan to attack it, in order to blunt the threat of British-Native American co-operation, was abandoned due to a lack of resources and the distance to the target. The following winter, the British improved the fortifications.

Detroit, however, demonstrated the extent to which the fate of fortified positions was not necessarily determined by sieges. Evacuated by the British in 1796 after Jay's Treaty in 1794, the poorly-commanded American garrison surrendered in 1812, to a smaller British-Native American force, when it lost its nerve as a result of failures nearby in the early stages of the War of 1812. In turn, Detroit was regained by the Americans in 1813 when they won an important na-

22 Cornwallis to General Sir William Medows, 4 Jan. 1791, NA. PRO. 30/11/173 f. 43, 45.

Fig. 1. Remains of the Lines of Torres Vedras, a massive, secret system of over 120 forts and earthworks conceived by Lord Wellington and constructed between October 1809 and September 1810 to protect Lisbon from French invasion during the Peninsular War

val battle on Lake Erie and the British abandoned the now-vulnerable position: the Great Lakes provided an instance of the combination of maritime power and fortifications.

In the nineteenth century, the context for fortification radically altered as a consequence of developments not simply in warfare, notably more potent artillery, but also as a result of broader economic and technological patterns, especially the consequences of imperial expansion, railways, and steamships. New fortifications became stronger, not least with extensive fortress complexes, concrete roofs, steel turrets, and disappearing cupolas that benefited from hydraulic mechanisms.

The location of works was related to more specific anxieties, particularly concerns about invasion as well as the defence of naval bases, as with the expensive fortifications built to protect Portsmouth.[23] Concern about French naval strength in the shape of steam-powered ironclads that appeared to make much of the navy redundant played a major role in mid-century, as did the increased range of artillery. Defences were improved around the Solent and on Guern-

23 A. Lambert, *No More Napoleons* (New Haven, Conn., 2025).

sey, while a 1859 Commission on the protection of the River Medway and the Chatham dockyard (the report of which was published in 1860)[24] and led to the Fortifications (Provisions for Expenses) Act of 1860, recommended an extensive defensive system, notably for Plymouth and Portsmouth, but not only there. Thus, there was to be a boom across the Medway protected by two new forts, Hoo and Darnet, each intended to have two tiers of guns mounted in a circle. They were begun accordingly in 1861, but problems with subsidence and cost overruns led to the forts being redesigned in 1867 and completed in 1871 with only a single tier of guns and with no boom. The forts were never used in action. Nor were the 'Palmerstonian Follies' surrounding Portsmouth, Plymouth and Chatham which would have tied up a very large garrison.[25] Later, in 1888-9, fortified magazines were planned around London – the London Defence Scheme or Stanhope Storehouses – mostly in the South Downs, for example at Box Hill, although they were soon considered obsolete.

A contrast between plans and implementation, and in terms of usage as in 'never used in action', for example for Fort George near Inverness, or for the 15-inch naval guns stationed on land in 1939 to protect the Singapore naval base, was very much familiar. Neither, however, is inherently a proof of failure: the first equated with adaptability, to both circumstances and context, while the second underplays the value of both deterrence and transferred opportunities for attack or defence, a point also true of the Maginot Line in France.

Vulnerability was also an issue across the Empire. Thus, from 1878, the defences of Esquimalt on Vancouver Island, the home of the Pacific Squadron, were pressed forward in response to a war scare with Russia which was developing Vladivostok as a base from 1860. For Esquimalt, it was decided to construct four batteries in order to provide protection for warships based there. For Bermuda, poor relations with America in the late 1840s and in 1861-2 led to an upgrading of the defences, and this continued even after the Treaty of Washington of 1871 greatly eased differences. Fort Hamilton was designed to protect Hamilton Harbour from an American invasion. It had a moat, underground passageways, and powerful guns. However, like other masonry forts, it swiftly

24 NA, War Office papers, 105/41.

25 I. Hogg, *Coast Defences of England and Wales, 1856-1956* (Newton Abbot, 1974); T. Crick, *Ramparts of Empire: The Fortifications of Sir William Jervois, Royal Engineer, 1821-1897* (Exeter, 2012).

appeared obsolescent in the face of improvements in long-range gunnery, including stronger guns and more effective explosives.

Concern about vulnerability played a role in land and sea strategies (not strictly coterminous with army and navy respectively, though closely linked to them) in the early twentieth century; with fortifications built, maintained and garrisoned accordingly. For example, a battery at Portkil on the Rosneath peninsula, to cover the River Clyde, was considered from the mid-Victorian periods and built in 1900-4. The position included searchlight batteries as well as pillboxes, blockhouses and trenches to protect the battery from land attack. The fort was decommissioned in 1928-9. So also with the landward defences for the major naval base at Rosyth on the Firth of Forth, blockhouses being a key element. The lower rate of deaths due to disease made garrisons less deadly, and were linked to key changes to their design, notably in sanitation and the provision of clean water.

The global impact of World War One (1914-18) included the need to protect Britain and the Empire against German warships as well as imperial positions from Ottoman advances. Lines of trenches were to protect London against German invasion. Ottoman forces advancing from Palestine threatened the Suez Canal, against which an unsuccessful overland attack was mounted in 1915. The British defence involved the deployment of troops, warships and aircraft, but also fortifications. There were posts on the eastern side of the canal and camps on the western side. Thus, Kantara, near the northern end, had a perimeter trench protected by a wire fence constructed, with additional trenches in which the reserve was based.

Very differently, and prefiguring modern urban warfare (although scarcely a new feature), *ad hoc* fortifications were used in Dublin during the Easter Rising in 1916. This was the case for rebel strongholds such as the Post Office, and for the army blockading them.

Separately, the development from the 1900s of aerial threats and, from World War One for Britain, attacks ensured a new aspect of fortification. In this, searchlights, spotters, barrage balloons, smoke screens and anti-aircraft guns were linked to fighter aircraft, while there was also the protection of airfields from parachutists and ground attack. As a consequence, the spatial footprint and dynamics of fortification altered greatly, becoming very spread out. Defences

were grouped in belts in order to protect ports, coastal areas (the point of access for air attacks) and London. Thus, in World War Two (1939-45), to the south of London, there was an inland gun belt and, closer, in an Anti-Diver Balloon-Barrage, Diver referring to dive bombers. The Maunsell Army and Navy Sea Forts in the Thames, Medway and Mersey Estuaries were intended to defend against air attack.

Greater mobility in the latter war ensured less of a reliance on large-scale defensive entrenchment systems than in World War One, but in both defence and attack, the British army had to address fortifications. Fortifications, moreover, were enhanced by more mobile opposing forces including their artillery and their reserves. The role of armour ensured that anti-tank defences, both stationary (including mines and ditches) and mobile (including anti-tank guns, self-propelled guns and tanks) played a major role. As a consequence, strengthening one of these components enhanced the 'fortified' nature of the defence, although, as noted in the Introduction, this raises the question of how best to distinguish fortifications, for if they are structures that presumably includes the artillery used in their defence and there is no reason why mobile artillery should be excluded. In 1942, the British in Egypt relied on artillery in defence, notably the new six-pounder anti-tank guns which were a major improvement on the two-pounders, and on tanks in defensive positions. The latter were a significant feature in defences, as by Israel and Syria in the Yom Kippur/Ramadan/October War of 1973, but also more generally. To a degree, they represented field fortifications, and notably so if the tanks were located in prepared positions.

In the autumn of 1942, in the final battle of El Alamein, the British employed combined armed tactics, especially artillery, in sequential blows in an attritional fashion in order to overcome prepared German-Italian defences defended by extensive minefields and well-located anti-tank guns. There was a parallel to John, Duke of Marlborough's successful tactics at Blenheim in 1704, not least in the ability, alongside sequential blows in different parts of the battlefield, to maintain the momentum of the attack, although that battle was a one-day affair.

Intelligence, meanwhile, was a key element in the defence, as in the attack. Thus, radar and ASDIC-sonar were in part a reflection of the novel nature of defence against three-dimensional attack that, unlike the weaponry of World War One, was inherently dynamic in character. Radar and ASDIC-sonar were

a response to the need to fix locations for accurate fire. This was very different in character to more conventional fortified positions on land such as the defensive perimeter rapidly established round Dunkirk in 1940 against the German advance. This perimeter made the best use of the plentiful local water features – manmade (canals) and natural, and, within that, had a secondary stop line of the Dunkirk to Furnes canal.

Similarly, Tobruk in Libya was successfully defended by the British in April-May 1941: an Italian outer defensive perimeter, built in the 1930s, proved important. It included concrete trenches, anti-tank ditches, and dozens of strongpoints, surrounded by barbed wire and mines, and connected by a supply line. Within, there were two secondary perimeters. On a long-established practice, maritime supply lines proved crucial to the British defence, as did the extent to which the besiegers were divided, part to battle against British relief forces advancing from Egypt.

In June 1942, in contrast, Tobruk fell to German-Italian attack. In part, this was due to skilful coordination between armour and artillery, with the addition of air support. British fortification practice also played a role: an overreliance on defence proved harmful because it enabled Erwin Rommel, the commander of the Panzer Army Africa, to direct the flow of the battle and, once heavily-attacked, the defensive positions could not be held.

World War Two also saw an unprecedented amount of fortification in the face of the risk of amphibious and/or airborne attacks. The GHQ (General Headquarters) Line of concrete pillboxes from Bristol to the Thames Estuary built in 1940 was intended to help protect against the consequences of German invasion and to provide a backup to coastal defences which included much barbed wire, anti-tank concrete cubes, mines and coastal artillery. Discussion about the defences saw points raised that were more generally significant for fortification, not least the value of static as opposed to mobile defences, the place of nodal defences as opposed to lines, and the availability of relevant resources, especially concrete and troops.[26]

Sometimes such fortification was successful, as with the German defence of Dieppe in 1942, but often not so. In large part, there `was the question not of the

26 M. Osborne, *Defending Britain. Twentieth Century Military Structures in the Landscape* (Stroud, 2004); S. Ross, *World War II Britain. History from Buildings* (London, 2006).

fortifications but of the 'garrison' in the shape of the density, mobility and responsiveness of the defence and their ability as a result to withstand the element of surprise achieved by the attackers, an ability ably shown by the Germans at Arnhem in 1944.

In turn, the attackers had to mount an effective tempo in landing and exploitation, including in overcoming defences. The Germans managed this on Crete in 1941, the Japanese on Singapore and Java in 1942, and the British in Madagascar the same year. In contrast, as at Gallipoli in 1915, Allied exploitation at Anzio in 1944 was slow, as it arguably was at Caen the same year.

There was also the strengthening during World War Two of already fortified positions, notably Dover and Gibraltar. In the latter, around 25 miles of tunnels were dug out of the rock to create workshops, quarters, supply dumps and a fully-equipped hospital. The excavated rock was used to build new runways. The context of fortification at Gibraltar in turn shifted, as a result of success in the war in the Mediterranean: from a forward-operating base to a rear area supply position. Both Dover and Gibraltar were also used as supply positions.

World War Two saw the impact on fortification capabilities of relief by sea. The siege of Malta in 1940-3, like that of 1565, showed vulnerability to attack as well as the difficulties faced by relieving forces. Air attacks made such relief, and indeed evacuation, far more problematic, as the British discovered at Crete in 1941 and Singapore in 1942.

After 1945, the British international focus switched to the threat from the Soviet Union. In army and naval terms, this entailed forward defence in northern Europe and the North Atlantic, notably as a member of NATO from 1949. Home defence principally focused on that against air and missile attacks, and fortification involved underground command centres with anti-blast, anti-radiation and other features.

Fortification of more conventional types was seen in the defence of Empire which was a particular type of 'Home Defence' and one that was highly significant until the withdrawal from Aden in 1967. Bases, for defence, deployment and action, all required protection, as did sites of authority. The sentries around the latter had to be secured in the event of a protest or attack. As a result of this, there was a surge in fortification after 1945, with a series of insurrections and terrorist campaigns, from Cyprus, Israel and Yemen, to Kenya and Malaysia

(modern names are used for states). This surge has been greatly underplayed in accounts of fortification, with the same being true for other colonial empires, as well as for post-colonial states seeking to establish their authority and boundaries and facing challenges to their rule.

In the British case, there was a late episode in Northern Ireland where the Provisional IRA, a radical Catholic paramilitary separatist movement, sought to overthrow the government from 1969 to 1997. In response, most fortified posts were joint police and army posts. In the Catholic areas of Belfast and in the border region of South Armagh in particular, these posts were fortified against the prevalent threats, from snipers, rocket-propelled grenades, mortars and car bombs. In response, corrugated iron sheets topped with razor wire provided a wall around most posts, which prevented observation of those living and working in the bases as well as sniper attack. Wire mesh screens, attached to the watch towers and placed several feet in front of them, were an effective deterrent against rocket-propelled grenades, which would explode against the mesh before hitting the tower itself. Living quarters and control-and-operation rooms in the most vulnerable bases had double-skinned roofs to protect them against mortar attacks. Large concrete blocks were placed in chicanes at the entrances to bases to prevent car bombs. These measures proved largely effective in protecting the occupants of bases, while a number of police stations were rebuilt to incorporate defensive features.

More generally, the standard fortification toolkit by the 1990s included blast-proof walls, narrow slit-type windows with toughened glass, and outside obstacles to prevent direct or close approach by vehicles. The last was the case for example at airports, which faced the dual threat of attack on the facilities and the attempt by terrorists to infiltrate aircraft in order to destroy or hijack them.

It is unclear how far the spread of drones may lead to new requirements. They certainly make wall systems less potent, as with their use to move drugs into prisons. However, in fortification, there has never been a ‘magic bullet’ defence, but, rather, a need to rely on a number of components. They include, principally, security personnel, whether troops, police or others; equipment, whether surveillance or lethal; and buildings and their features. The last are seen as fortifications, but scarcely exhaust the definition or topic of such defences. This will remain the case.

Serenissimus Georgius D.G. Hassiæ Landgravius Princeps Hirsfeldiæ Comes in
Cattumelibocco Dietz, Kyrenhaina Nidda, Schauenburgo, Isenburgo et Budinga, Eques
Nobilis Ordinis Aurei Velleris Sacræ Cesareæ Majestatis Campi Mareschallus,
Et Regiminis Catafractorum Præfectus Hispaniæ Procer Anno Domini MDCCIII.

Fig. 2. John Smith, Prince George of Hesse-Darmstadt (1669-1705), who commanded the garrison of Gibraltar, captured in August 1704, during the first Spanish siege (September 1704-May 1705). Fine Art Museums of San Francisco. Wikimedia Commons

Fortresses during the Napoleonic Wars

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The military historiography of the Napoleonic era has long privileged narratives of sweeping manoeuvres and decisive battles, relegating fortresses to the margins as supposed relics of the Ancien Régime. Yet such a view obscures a central reality of the early modern war – the reduction of fortresses remained, in Carl von Clausewitz's words, an "unavoidable evil," a persistent operational and strategic necessity.[1] Commanders of all armies prized speed, operational flexibility, and the destruction of enemy field armies, but they could not escape the reality of fortresses that blocked advances, anchored enemy supply systems, secured communications, and embodied political authority. To bypass them was often to court disaster; to capture them was to assume the burdens of time, attrition, and blood. In theaters defined by rugged geography (Portugal, Spain, the Caucasus, and the Danubian basin), poor infrastructure, immense distances, and/or pervasive insurgency, fortresses remained indispensable operational anchors, controlling corridors of invasion, securing fragile supply lines, and offering rare sanctuaries in hostile landscapes.

Across the vast geographic expanse of the Napoleonic Wars—from the fro-

1 For fresh reassessments see essays in Zack White, ed. *An Unavoidable Evil: Siege Warfare in the Age of Napoleon* (Warwick UK, 2025); Jeremy Black, *Fortifications and Siegecraft: Defence and Attack Through the Ages* (Lanham, MD, 2019); Fergus Robson, "Siege Warfare in Comparative Early Modern Contexts: Norms, Nuances, Myth and Massacre during the Revolutionary Wars," in Alex Dowdall and John Horne, eds., *Civilians under Siege from Sarajevo to Troy* (Basingstoke, 2017), 83–105. For a classic overview see Christopher Duffy, *Siege Warfare: The Fortress in the Early Modern World, 1494–1660* (London, 1979); idem., *The Fortress in the Age of Vauban and Frederick the Great, 1660–1789* (London, 1985). For a study of the customary laws of siege craft, see Lesaffer, Randall, 'Siege Warfare in the Early Modern Age: A Study on the Customary Laws of War', in Amanda Perreau-Saussine and James Bernard Murphy, eds., *The Nature of Customary Law* (Cambridge, 2007), 176–202.

zen littorals of Finland to the Iberian Peninsula and the contested Danubian frontier—siege warfare was both ubiquitous and exacting. In Spain and Portugal alone, roughly thirty formal sieges were conducted between 1808 and 1814, a figure that multiplies when we extend our gaze across the rest of the continent, especially in southeastern Europe. The pattern there was not new - during the Russo-Ottoman War of 1787–1791, only three of the ten pivotal engagements were open battles; the remainder revolved around sieges or attempts to relieve fortresses. The same dynamic persisted in the Russo-Ottoman War of 1806–1812, where more than half of decisive encounters centered on fortified positions. Fortresses thus imposed their own rhythm upon campaigns. They dictated tempo, constrained manoeuvre, and structured the sequence of operations. Siege warfare demanded not only engineering expertise but the orchestration of vast logistical systems: heavy artillery transport, trench construction, supply maintenance under hostile conditions, and the management of disease, desertion, and morale.

Nowhere was this more evident than in the Iberian Peninsula.[2] During the initial years of the conflict, French operations were shaped by the need to subdue Spanish fortresses and fortified cities. At Zaragoza, which featured a combination of medieval battlements and newly built ramparts, the siege led to a horrific urban struggle involving regular troops and armed civilians, ultimately costing over 50,000 Spanish and 12,000 French casualties. Gerona endured a grueling six-month siege (May-December 1809) driven by a spirit of competitive military and municipal obstinacy, with its governor, Mariano Alvarez, determined to outlast Zaragoza's legendary defense. A year later, Marshal Michel Ney's VI Corps spent five months (April-Auguist 1810) besieging the strategically important fortresses of Ciudad Rodrigo and Almeida to clear the path for the French invasion of Portugal.[3]

As the strategic initiative shifted in 1809-1810, British commander Arthur

2 For broad overview see Philip Haythornthwaite, 'Sieges in the Peninsular War', in Paddy Griffith, ed., *A History of the Peninsular War: Vol IX: Modern Studies in Spain and Portugal, 1808–1814* (London, 1999), 213–230; Frederick Myatt, *British Sieges of the Peninsular War* (Stroud, 2008). For more substantive discussion, see Gavin Daly, *Storm and Sack: British Sieges, Violence and the Laws of War in the Napoleonic Era, 1799–1815* (Cambridge, 2022).

3 Donald D. Howard, *Napoleon and Iberia: The Twin Sieges of Ciudad Rodrigo and Almeida, 1810* (Tallahassee, FL, 1980).

Wellesley, the future Duke of Wellington, recognized that advancing into the Spanish heartland was impossible without wresting control of the borderland fortresses of Almeida, Ciudad Rodrigo and Badajoz. Guarding the principal invasion corridors between Spain and Portugal, these strongholds became strategic fulcrums upon which entire campaigns turned; until these "keys to Spain" were wrested from French control, any advance by Wellesley's army into the interior risked isolation and defeat. However, the British army's capacity to conduct formal European sieges was severely hindered by institutional deficiencies. The army suffered from a chronic shortage of trained sappers and miners, lacked adequate siege trains and faced massive logistical hurdles in transporting heavy artillery across the road-poor Peninsula. The eventual British capture of the fortresses in 1812 opened the road into Spain, but at a cost that revealed the brutal nature of siege warfare: night assaults through breaches, columns advancing over rubble and corpses, and garrisons resisting with desperate tenacity.

A similar dynamic prevailed along the Lower Danube, where the Ottoman Empire compensated for its comparative weakness in open battle by relying on a dense network of fortifications. Strongholds such as Izmail, Brăila, Ruse, and Silistra formed a defensive chain that transformed the river into a powerful barrier that disrupted, repeatedly, the momentum of Russian armies advancing through the Wallachian countryside. Each of these fortified nodes demanded prolonged blockade (if not outright investment) and bombardment, drawing campaigns into cycles of attrition that blunted operational initiative, much to the frustration of Emperor Alexander I of Russia who repeatedly demanded his generals to advance into Bulgaria. The Danubian theater thus reveals siege warfare not as a peripheral activity, but as a central mechanism through which a weaker power could impose strategic friction upon a stronger adversary.

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The expansion of military forces during the Napoleonic Wars placed unprecedented strain upon logistical systems. Field armies numbering in the hundreds of thousands could no longer subsist solely through requisition or local foraging; they required structured systems of supply anchored in fixed depots. Fortresses fulfilled this role, serving as logistical hubs and operational pivots. This integration of fortification and logistics was evident in northern Italy where

both Austrian and French commanders made extensive use of the Quadrilatero system, linking the fortresses of Peschiera, Mantua, Legnago, and Verona across the river lines of the Mincio, Po, and Adige in Lombardy-Venetia regions. This network formed a defensive and logistical framework of remarkable resilience, capable of sustaining prolonged operations while constraining enemy maneuver. Its significance was already apparent during the Italian campaigns of the 1790s, when the siege of Mantua (1796–1797) became the decisive hinge of Napoleon's early victories. Similarly, the siege of Genoa in 1800, though ultimately ending in capitulation, delayed Austrian operations long enough to enable Napoleon's crossing of the Alps and the subsequent victory at Marengo. In both cases, the presence of fortified depots dictated the tempo of campaigning.[4] A comparable dynamic unfolded during the French invasion of the Kingdom of Naples in 1806-1811. Coastal fortresses such as Gaeta and Amantea became focal points of resistance against French occupation. Their maritime access allowed them to be resupplied and prolonged their resistance beyond what might otherwise have been possible. The thirty-eight-day siege of Amantea (December 1806–February 1807), in particular, acquired symbolic significance as a rallying point of Calabrian defiance, illustrating how even relatively minor strongholds could exert disproportionate political influence.[5]

Further north, the great fortress system of Bohemia played a quieter but no less critical role. Strongholds such as Josephstadt (Josefov), Theresienstadt (Terezín), Königgrätz (Hradec Králové), Pardubitz (Pardubice), and Olmütz (Olomouc) formed a defensive lattice capable of supporting large-scale coalition operations and serve as secure bases for concentration, supply, and reorganization. It was at Olmütz, in particular, that the Russo-Austrian army regrouped before launching the ill-fated offensive that culminated in Napoleon's decisive victory at Austerlitz on 2 December 1805. Napoleon's conquest of Prussia in 1806 further highlighted the complex role fortresses could play as operational anchors, logistical hubs, and, in moments of crisis, sanctuaries for shattered

4 On the role of Mantua and the rest of the Quadrilatero during the first two Coalition wars, see Phillip R. Cuccia,, *Napoleon in Italy: The Sieges of Mantua, 1796–1799 (Norman,* OK, 2014). For subsequent conflicts, see Frederick C. Schneid, *Napoleon's Italian Campaigns 1805–1815* (Westport, CT, 2002).

5 Milton Finley, *The Most Monstrous of Wars: The Napoleonic Guerrilla War in Southern Italy, 1806-1811* (Columbia, SC, 1994), 82-94.

armies. Following the catastrophic twin defeats at Jena and Auerstädt on 14 October 1806, the remnants of the Prussian forces scattered across northern and eastern Germany, seeking refuge in fortified cities throughout Pomerania, Silesia, and Poland. In theory, this network of strongholds—Glogau, Breslau, Schweidnitz, Glatz, Neisse, Brieg, and Kosel—offered a framework upon which continued resistance might be organized. In practice, however, the psychological shock of defeat proved decisive.[6] The collapse of the Prussian field armies reverberated through the fortress system, undermining confidence and eroding the will to resist. Many garrison commanders, deprived of hope for relief and demoralized by the scale of the disaster, capitulated with little or no resistance. Fortresses such as Küstrin, Stettin, and even the formidable Magdeburg surrendered in rapid succession, often under circumstances that shocked contemporaries. These capitulations underscored a fundamental truth that the strength of fortifications depended as much upon the morale and resolve of their defenders as upon the thickness of their walls. We should note, however, that this pattern was not universal and certain strongholds did resist with remarkable tenacity, most notably Kolberg, where the garrison and townspeople mounted a determined defense that would later assume a central place in Prussian national mythology. Such episodes demonstrated that, under different psychological and leadership conditions, fortresses could still serve as focal points of resistance, capable of delaying the enemy and preserving a sense of national continuity amid military collapse.

As Napoleon advanced toward the Vistula during the winter of 1806–1807, he moved beyond the opportunistic exploitation of Prussian weakness and began systematically integrating fortresses into his own operational design. Recognizing their value as logistical and strategic nodes, he strengthened key positions at Sierock, Modlin, Warsaw, and Thorn, transforming them into secure depots and anchors for his lines of communication. These fortified points enabled the French army to operate deep within hostile territory while maintaining cohesion and supply. The most formidable obstacle in this phase of the campaign was Danzig. Commanding the mouth of the Vistula and serving as a potential entry point for British or Swedish intervention, the fortress posed a direct threat to

6 See Peter Paret, *The Cognitive Challenge of War: Prussia, 1806* (Princeton, 2009).

Napoleon's flank and communications. Its reduction required a prolonged and resource-intensive siege, delaying French offensive operations until the stronghold finally capitulated in late May 1807. In this instance, as in so many others, the fortress dictated the tempo of the campaign, imposing delay, consuming resources, and forcing operational recalibration.[7]

The campaign demonstrated the great importance Napoleon attached to fortifications, regarding them as indispensable instruments in both offensive and defensive warfare. Yet his understanding of their function was characteristically nuanced. Fortresses, he argued, could not by themselves arrest a determined enemy advance; their value lay elsewhere. Properly employed, they served to delay, disrupt, weaken, and harass a victorious opponent—imposing friction upon his operations and buying time for strategic recovery or counterstroke. Central to Napoleon's conception was economy of force. Fortresses, in his view, ought to be held by relatively small garrisons, ideally drawn from local populations rather than from the field army. In this sense, he envisioned them as a form of militarized militia system—fixed points of resistance that secured key terrain without draining the mobile forces upon which decisive operations depended. Their primary function was to hold essential nodes—river crossings, depots, lines of communication—while the field army maneuvered freely. At the same time, Napoleon conceived fortresses not as isolated structures but as elements within a broader spatial system. Their significance extended beyond the literal range of their guns; by their position, they exerted a sphere of influence, shaping enemy movement, constraining lines of advance, and forcing adversaries into predictable operational patterns. In this sense, fortifications operated as instruments of strategic geometry, structuring the battlefield even when not directly engaged. This integrated vision extended beyond permanent fortresses to encompass temporary and field fortifications. Napoleon made frequent and effective use of *têtes de pont*—fortified bridgeheads that secured river crossings and enabled both offensive thrusts and controlled withdrawals.[8]

In theaters marked by insurgency, fortresses were especially important for

7 See F. Lorraine Petre, *Napoleon's Campaign in Poland, 1806–1807* (London 1901), 237-257; Natalia Griffon de Pleineville and Vladimir Chikanov, *Napoléon en Pologne: la campagne de 1806-1807* (Paris, 2008).

8 Bruno Colson, *Napoleon on War* (Oxford, 2015), esp. 270-280.

the protection of communications and supply lines. In Spain, French forces relied on networks of fortified towns, castles, and blockhouses to secure roads and convoys against guerrilla attack. This system, however, imposed a heavy cost. Large numbers of troops were immobilized in garrisons, reducing the strength of field armies. Marshal Louis-Gabriel Suchet's army in eastern Spain, for instance, found more than half its manpower tied down holding cities such as Zaragoza, Tortosa, Tarragona, and Lérida, limiting its ability to respond to strategic developments elsewhere. Similarly, the Army of the North was compelled to lock up nearly half of its 35,000 men in small garrisons along the Biscay coast and the major roads, utilizing minor forts to provide immediate refuge for convoys threatened by insurgents. At the same time, coastal fortresses such as Santona, Peniscola, and Peniche possessed unique strategic value, as their maritime access allowed Spanish forces to be continuously resupplied by British naval power, rendering them exceptionally difficult to reduce and serving as vital ports of entry or shelters for retreating forces.

The early phase of the Peninsular War (1808–1811) witnessed a transformation of siege warfare under the pressure of popular resistance. At Zaragoza and Gerona, the conflict became a *guerra de pueblo* (people's war), dissolving the boundary between soldier and civilian. Urban space was highly militarized: houses became forts and almost entire urban populations participated in defense. The result was a form of warfare marked by extraordinary intensity and human cost; tens of thousands perished in struggles that obliterated any meaningful distinction between battlefield and city. Such resistance provoked increasingly brutal responses from French commanders. Frustrated by the refusal of Spanish cities and fortresses to submit according to established conventions, they resorted to terror and exemplary violence. At Lérida in April-May 1810, Marshal Suchet forced civilian population into the citadel which he then subjected to bombardment in order to compel surrender. The capture of Lérida marked the opening of one of the most methodically executed and consistently successful siege campaigns of the entire Napoleonic era. Suchet's III Corps demonstrated a rare combination of operational discipline, logistical coherence, and ruthless determination, qualities that rendered it, in contemporary eyes, almost invincible. Unlike other French commanders whose operations in Spain were undermined by overextension and guerrilla disruption, Suchet pursued a

systematic reduction of fortified positions, each success reinforcing the next and steadily consolidating French control over eastern Spain. The sequence began with the siege of Mequinenza, situated at the confluence of the Ebro and Segre rivers, its steep approaches and natural defenses complicating any assault. Yet Suchet's methods—careful artillery preparation, coordinated engineering work, and sustained pressure—brought about its fall in early June. The operation, though less dramatic than later sieges, was strategically significant: it secured the line of the Ebro and removed a persistent threat to French communications in the region. From Mequinenza, Suchet advanced to Tortosa, one of the most important strongholds in Catalonia. The siege, conducted through the latter half of 1810, reflected a more classical, methodical approach to fortress reduction. Rather than risking premature assault, Suchet relied on steady bombardment, progressive investment, and the erosion of the garrison's capacity to resist. On 2 January 1811, the Spanish commander, General Miguel de Lili, Count of Alacha, capitulated. The terms reflected the scale of the operation: nearly 4,000 survivors marched into captivity, along with 182 artillery pieces and nine regimental colors. Tortosa's fall marked not merely a tactical victory, but the collapse of a major defensive anchor in northeastern Spain. Yet it was at Tarragona that Suchet's siege craft reached its most brutal and decisive expression. The strongly fortified city represented a final bastion of Spanish resistance in the Catalonia region. After weeks of preparatory operations, which included constructed on trenches and bombardment, the French launched a climactic assault on 28 June 1811. What followed was a violent rupture that descended rapidly into massacre that claimed at least 7,000 lives. Taken together, these operations illustrate both the strengths and the moral ambiguities of Suchet's campaign. His sieges were marked by operational coherence and technical competence rarely repeated elsewhere in the Napoleonic Wars, yet they also embodied the escalating brutality that defined the war in Spain.[9]

When the strategic initiative shifted to the Allies in 1812, Wellington's army

9 On the nature of violence, see Philip Dwyer, "'It Still Makes Me Shudder": Memories of Massacres and Atrocities During the Revolutionary and Napoleonic Wars," *War in History,* 16 (2009), 381–405.; idem., "Violence and the Revolutionary and Napoleonic Wars: Massacre, Conquest and the Imperial Enterprise*," in Journal of Genocide Research,* 15 (2013), 117–131; Alice Parker, " 'Incorrigible Rogues': The Brutalisation of British Soldiers in the Peninsular War, 1808–1814," *British Journal of Military History,* 1 (2015), 42–59.

confronted the same realities under even less favorable conditions. Lacking sufficient engineers and facing immense logistical challenges, British siege operations were characterized by improvisation and urgency; at Ciudad Rodrigo, Captain John Burgoyne – who went on to become chief British engineer during the War of 1812 and the Crimean War and finished his career as a field marshal - was compelled to train line infantry in the specialized tasks of sapping, trenching, and constructing fascines and gabions, an improvisation he regarded as both dangerous and disgraceful. Transporting heavy artillery across the rugged terrain of eastern Portugal required immense logistical effort.[10] For the siege of Ciudad Rodrigo in 1812, the battering train—comprising guns, ammunition, and even a limited reserve of shot—required hundreds of tons of transport, thousands of draught animals, and a vast number of civilian drivers.[11] These convoys moved slowly across broken terrain, vulnerable to weather, terrain, and guerrilla interference. Every siege thus became a race against time, Wellesley's most persistent enemy. Operating with relatively limited forces, he was acutely aware that French relief armies—under commanders such as Auguste de Marmont or Jean-de-Dieu Soult—might appear at any moment. This pressure profoundly altered British siege practice. The slow, methodical reduction was often abandoned in favor of accelerated operations: breaches were attacked early, sometimes prematurely, in what amounted to a calculated gamble: better to risk heavy losses in a rapid assault than to lose a larger battle to a relieving force. Thus emerged, in British practice, a renewed reliance on the *attaque brusque*, not as doctrinal preference, but as operational necessity.[12]

10 For a good overview see Mark S. Thompson, *Wellington's Engineers: Military Engineering in the Peninsular*

War 1808–1814 (Barnsley, 2015).

11 Ian Fletcher, *In Hell Before Daylight: The Siege and Storming of the Fortress of Badajoz, 16 March to 6 April 1812* (New York, 1984).

12 For excellent analysis of the British sieges, see Gavin Daly, '"The Sacking of a Town Is an Abomination": Siege, Sack and Violence to Civilians in British Officers' Writings on the Peninsular War – The Case of Badajoz', Historical Research, 92 (2019), 160–182; idem., "Anglo-French Sieges, the Laws of War, and the Limits of Enmity in the Peninsular War," English Historical Review, 135 (2020), 572–604; idem., "British Soldiers, Sieges, and the Laws of War: The 1807 Siege of Montevideo," in Kevin Linch and Matthew Lord, eds., *Redcoats to Tommies: The Experience of the British Soldier from the Eighteenth Century* (Woodbridge, 2021), 103–119.

If British expediency drove assaults forward, French doctrine, meanwhile, hardened resistance. Napoleon, acutely aware of the psychological and material costs imposed by siege operations, sought to weaponize resistance itself. His 1810–1811 directives forbade French commanders and governors from capitulating. "One must hold out until the last moment, without calculating if one will be aided or not," he specifically instructed in May 1811. "To surrender a day earlier is a military crime. A commander must be oblivious of everything but his post and prolong its defence without seeking any political justification."[13] French commanders took this mandate seriously. At Badajoz and San Sebastián, commandants such as Armand Philippon and Emmanuel Rey fought with fierce determination; the breach, once a signal of impending surrender, became instead the focal point of the fiercest resistance. At Badajoz in early April 1812, British assault columns were hurled repeatedly into these fortified breaches under murderous fire. The result was carnage: over 3,700 casualties in a single night.[14] Similar scenes unfolded at San Sebastián in September 1813, where attacking troops struggled across flooded terrain and were decimated before gaining the walls. In these moments, the siege reached its most violent expression—an intimate, chaotic struggle fought at close quarters in darkness, smoke, and confusion. The horrors of fighting did not end with the fall of the fortresses. The psychological strain of the assault—combined with exhaustion, rage, and the lure of plunder—frequently shattered discipline within the victorious armies. At Ciudad Rodrigo, Badajoz, and San Sebastián, British troops, who had fought with extraordinary courage, descended into uncontrolled violence that reveals the moral disintegration that could follow the storming. Alcohol, readily available in captured towns, exacerbated the breakdown of order. Officers, often powerless to restrain their men in the immediate aftermath of such intense combat, struggled to reassert control. When San Sebastián fell on September 8, 1812, almost half of the town's population was killed by the British troops, enraged at the heavy losses they had suffered. The catastrophe was then compounded by fire that reduced much of the city to ruins, transformed military victory into

13 Napoleon to Clark, with a note on the defense of Corfu, 19 May 1811, in *Correspondance de Napoléon Ier; publiée par ordre de l'empereur Napoléon III* (Paris, 1867), XXII, 166, no. 17732.

14 Jack Allen Meyer, "Wellington and the Sack of Badajoz: A 'Beastly Mutiny' or Deliberate Policy?," *Consortium on Revolutionary Europe 1750–1850, Proceedings,* 21 (1991), 251–257.

humanitarian disaster and provoked diplomatic tensions between British commanders and their Spanish allies.[15]

Burgos occupies a dual position in the military history of the Peninsular War, serving first as a site of French atrocity following a field engagement in 1808, and later as the scene of the Wellington's most pronounced siege failure in 1812. During the initial phase of the war, as Napoleon launched a sweeping counteroffensive and defeated regular Spanish forces, French troops poured into the city in direct pursuit of fleeing soldiers. The ensuing sack demonstrated the brutal realities of French pacification strategies in Spain. As the Comte Miot de Melito observed, the event exhibited all the horrific characteristics of a stormed fortress despite the absence of a formal siege: "The churches were sacked, the streets were choked with the dead and the dying; in fact we witnessed all the horrors of an assault, although the town had made no defence!"[16] Four years later, the strategic initiative had shifted to the British. Following his decisive victory at the Battle of Salamanca and the subsequent liberation of Madrid, Wellington pressed northward to lay siege to the French-held fortress of Burgos in September and October. The obstinate and sanguinary resistance encountered by the British at Burgos was a direct manifestation of Napoleon's imperial directive for fortress commander not to surrender. Wellington, deeply frustrated by what he considered an abrogation of eighteenth-century surrender conventions, did not even issue a formal summons to the French governor of Burgos, convinced that the Frenchman would not surrender before a breach had been stormed. The ensuing four-week siege of Burgos stands as perhaps Wellington's greatest command failure of the entire war. The British operations were characterized by severe institutional and logistical friction. The offensive was rushed, and the besieging forces were equipped with a grossly inadequate number of siege guns for the task at hand. Furthermore, the highly technical demands of the siege exposed chronic deficiencies within the British army's specialist branches; mines were deployed without the expertise of trained miners, and there was an almost

15 Gavin Daly, "'The Sacking of a Town Is an Abomination': Siege, Sack and Violence to Civilians in British Officers' Writings on the Peninsular War. The Case of Badajoz," *Institute of Historical Research* 92, no. 255 (February 2019): 160– 182.

16 André François Miot de Melito, *Memoirs*… translated by Cashel Hoey and John Lillie (London, 1881), II, 279-280.

total absence of sappers. These operational shortcomings necessitated a reliance on ill-conceived infantry assaults against a determined French garrison. The culmination of this operational mismanagement was a final, desperate, and ultimately unsuccessful storming attempt on 19 October 1812. Having suffered some 2,000 casualties during the disastrous operation, Wellington was forced to raise the siege the following day. The failure before the walls of Burgos precipitated a bitter and demoralizing British retreat back towards the Portuguese borderlands for the winter. This withdrawal was marked by severe deprivation and a widespread breakdown in troop discipline, with British soldiers marauding and plundering the local countryside. [17]

Along the maritime periphery of the conflict, the strategic utility of fortresses assumed an amphibious dimension. Coastal strongholds functioned as critical interfaces between land and sea power, enabling the coordination of joint operations and the secure transfer of matériel. The Cantabrian ports of Santander and Castro Urdiales, for instance, emerged as vital nodes in the British war effort in Spain. Shielded by their fortifications and supported by the Royal Navy, these harbours became conduits through which arms, provisions, and reinforcements flowed steadily into the Peninsula. At the same time, their occupation denied the French a stable maritime flank, forcing them to operate under constant strategic pressure. These and other fortresses also served as refuges in moments of crisis. When field armies faltered—whether through defeat, exhaustion, or overextension—they could withdraw behind defensive works, regroup, and await reinforcement.

Beyond their material and operational roles, fortresses possessed a profound symbolic and psychological significance that often outweighed their immediate military utility. To hold a fortress was to embody authority, stability, and control; to lose one was to invite repercussions far beyond the battlefield, eroding political legitimacy, public morale, and political confidence. This dynamic was particularly pronounced in the colonial sphere. The British East India Company

17 Charles Esdaile and Philip Freeman, *Burgos in the Peninsular War, 1808–1814: Occupation, Siege, Aftermath* (Basingstoke, 2015). For an interesting discussion see G. A. Steppler, "British Military Law, Discipline and the Conduct of Regimental Courts Martial in the Later Eighteenth Century," *The English Historical Review,* 102 (1987), 859–886.

deliberately cultivated its army's reputation as a master of siege craft, recognizing that the rapid reduction of prominent fortresses could yield effects disproportionate to their tactical value. Indian polities had long invested immense symbolic and political capital in their fortified capitals, long regarded as impregnable and imbued with dynastic prestige. British commanders understood that breaching such defenses would not merely secure territory but fracture the morale foundations of resistance. The storming of Seringapatam on May 4, 1799 – as well the capture of Aligarh and Gawilghur in 1803 - was not simply an act of conquest but carefully staged demonstration of imperial power, showcasing the technological, financial, and organizational superiority of British arms.[18] The fall of these fortresses signaled, to contemporaries across the subcontinent, that no wall could withstand the power of British arms. Comparable logic operated in Eastern Europe. The Russian decision to storm the Ottoman fortress of Izmail in December 1790 illustrates the same fusion of military action and psychological intent. While Izmail held undeniable operational importance along the lower Danube, Alexander Suvorov framed the assault in explicitly political and moral terms. At the council of war on the eve of the attack, he posed a question that revealed his broader vision: "If we conquer Izmail, who will dare to stand in our way?" The objective was not merely to seize a fortress, but to impose a shock upon the Ottoman side and to demonstrate, through overwhelming violence, the futility of resistance. The result was indeed transformative. The dramatic success of the assault, achieved at enormous cost of almost entire population of Izmail, resonated deeply within Russian military culture. It established a powerful precedent: that decisive, uncompromising action against fortified positions could yield not only tactical success, but broader strategic victory.

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During the Russo-Ottoman War of 1806–1812, the ethos of Napoleonic maneuver warfare collided sharply with the Ottoman Empire's entrenched reliance on fortified strongholds.[19] In this conflict – more than any other Napoleonic era

18 Joshua Provan, "The Siege Lords: British Siege Warfare in India, 1792–1805," in White, *An Unavoidable Evil,* 93-112.

19 See A. Petrov, *Voina Rossii s Turtsiej 1806–1812 gg.* (St. Petersburg: V. S. Balashev, 1887), 3 volumes; Alexander Mikhailosvkii-Danilevskii, *Polnoe sobranie sochinenii. Tom III: Opisanie Turetskoi voiny s 1806 do 1812 goda* (St. Petersburg: Tip. Shtaba Otd.

conflicts - fortresses were not incidental obstacles on the path to decisive battle; they were the strategic fulcrum upon which the war turned. Time and again, Russian offensives were arrested before the chain of Ottoman fortresses on the Danube while the Russian high command fractured over a fundamental question of military method: whether to rely on the *attaque brusquée*—the sudden escalade, the violent storm "on the fly," as one Russian commander put it — or to proceed through methodical investment, bombardment, blockade, and calculated attrition. Russian attempts to seize these fortresses frequently faltered under the weight of impatience, inadequate logistics, and a dangerous reverence for precedent. The memory of Suvorov's storming of Izmail loomed large, encouraging the belief that audacity could substitute for preparation. This illusion reached its bloody apogee in 1809-1810. Field Marshal Alexander Prozorovsky, eager to replicate Suvorov's success, dismissed the cautions of experienced subordinates such as Mikhail Kutuzov, who warned that the Ottoman defenses had not been sufficiently weakened. The assault that followed was catastrophic. Russian troops, advancing against intact Ottoman ramparts, found themselves trapped in the deep moat, their ladders too short to climb the glacis and their formations compressed under devastating fire that ultimately claimed over 4,700 men. The failed assault at Braila meant that the Russian offensive of 1809 collapsed before it had truly begun. It exposed, with brutal clarity, the difference between calculated boldness and reckless imitation.[20]

The disaster forced Tsar Alexander I to confront the deficiencies of Russian siege doctrine. He criticized the habitual reliance on unsupported escalade and insisted that assaults must follow proper breaching operations. At the same time,

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Korpusal Vnutren. Strazhi., 1849); Unfortunately, there is still no modern English-language study of the Russo-Ottoman Wars of 1806-1812. For an earlier conflict, see Brian Davies, *The Russo- Turkish War, 1768– 1774. Catherine II and the Ottoman Empire* (London: Bloomsbury, 2016); Małgorzata Karkocha, *Flagrante bello. Wielka wojna wschodnia w relacjach prasy warszawskiej (1787–1792)* (Lodz, 2021). For a wider context, see Brian Davies, *Empire and Military Revolution in Eastern Europe: Russia's Turkish Wars in the Eighteenth Century* (London: Continuum, 2011). For the Ottoman side, see Virginia H. Aksan, *Ottoman Wars, 1700– 1870: An Empire Besieged* (New York: Pearson, 2007); Stanford J. Shaw, *History of the Ottoman Empire and Modern Turkey* (Cambridge: Cambridge University Press, 1976), I:217-276.

20 For details see Alexander Mikaberidze, *Kutuzov: A Life in War and Peace* (Oxford, 2022), 278-294.

he raised a broader strategic question: whether certain fortresses might be bypassed altogether in favor of deeper penetrations into Ottoman territory. Yet recognition did not immediately produce reform. Institutional learning remained uneven, constrained by habit, personality, and the lingering prestige of Suvorov's legacy. For a brief period, General Peter Bagration demonstrated a more sustainable alternative. Replacing Prozorovsky in late 1809, he avoided costly assaults and instead relied on blockade, pressure, and isolation to compel the surrender of several Ottoman positions, including Măcin, Hirsova, Constanța, Mangalia, and Izmail. His approach suggested that fortresses need not always be taken by storm; they could be neutralized through persistent investment. Yet this lesson proved fragile. His successor, General Nikolay Kamensky, reverted in 1810 to the cult of *attaque brusquée*, ordering an ill-prepared assault on Ruse. The result mirrored Brăila: troops trapped in the moat, caught in crossfire, and decimated. The failed assault claimed the lives of 78 officers and over 3,000 soldiers, while another 285 officers and 5,077 soldiers were wounded, most of them heavily; this amounted to almost half of 17,300 men that Kamenskii had committed to the assault. The hard lessons of the 1809 assault on Braila that could have saved many lives were simply ignored.[21] Poignantly, a month after the failed storming, Kamenskii routed the Ottoman field army at Batin which prompted the garrison of Ruse to surrender. "This was a clear proof that was absolutely no need for that calamitous assault," ruefully noted a Russian participant.[22]

Only with Mikhail Golenischev-Kutuzov's assumption of command in 1811 did a coherent strategic synthesis emerge. Rejecting the wasteful cycle of assault and repulse, he reframed the fortress as an operational problem rather than a tactical obsession. Ottoman strongholds were masked and blockaded, while the main Russian effort was directed against the enemy's field army. This approach culminated in the campaign around Slobozia-Ruse, where Kutuzov maneuvered with patience and precision to isolate and destroy the principal Ottoman force.

21 Petrov, *Voina Rossii s Turtsiej 1806–1812 gg.* III: 96-112. After the failed assault on Ruse, Kamenskii reverted to the blockading, which eventually produced results as the fortresses of Ruse and Giurgiu capitulated in late September 1810.

22 Aleksei Scherbatov, *Moi vospominaniya*, edited by A. Shiryaeva (St. Petersburg: Nestor-Istoriya, 2006), 70.

By shifting emphasis from walls to armies, he broke the strategic deadlock and forced the Porte toward peace. His campaign of 1811 thus demonstrated a hard-won principle: integration of siege, blockade, and maneuver into a unified operational design.

In the Caucasian theater of the Russo-Ottoman War, siege warfare assumed a different but equally demanding character. Here, the challenges were compounded by terrain—the Lesser Caucasus range—and by the ever-present threat of Ottoman and Persian field forces converging on isolated Russian detachments. If the Danube presented a fortified river frontier, the Caucasus resembled an archipelago of isolated citadels embedded in a hostile environment. Campaigning was shaped by scarcity, distance, and vulnerability; every siege became an exercise in endurance and improvisation. Early operations repeated the errors of the Danube. In 1807, General Ivan Gudovich attempted a hasty assault on the Ottoman fortress of Akhalkalaki, only to see his troops repulsed amid confusion and inadequate preparation; nearly 900 casualties forced a Russian retreat, reinforcing the lesson that escalade without preparation was futile. More promising methods emerged under General Alexander Tormasov, who combined military operations with political and psychological pressure. At Poti in 1809, Russian forces coordinated naval bombardment with a local uprising, isolating the Ottoman garrison and compelling its surrender. A year later, a Russian force seized and destroyed the Ottoman fortress of Sujuk-Qale (now Novorossiysk). There were, however, notable setbacks that revealed the fragility of Russian operations when confronted by logistical overreach and environmental hazards. In 1807, a Russian amphibious expedition succeeded in capturing the Ottoman fortress of Anapa on the eastern Black Sea coast. Yet the very conditions that had made the assault possible rendered its retention untenable - isolated, undersupplied, and exposed to counterattack, the Russian garrison could not be sustained there for long. Rear Admiral S. Pustoshkin was therefore compelled to abandon the position. Three years later, the siege of Akhaltsikhe began under favorable conditions, with Russian forces making steady progress against the Ottoman defenses. Yet the operation was abruptly derailed by the outbreak of plague within the city. The disease threatened not only the garrison but the besieging army itself. Faced with the risk of catastrophic contagion, the Russian command abandoned the siege entirely, prioritizing the preservation of the army

over the capture of the fortress. The most striking success came at Akhalkalaki in December 1811 under Colonel Peter Kotlyarovsky who launched the *attaque brusquée* after careful preparations that involved specially constructed ladders and surprise crossing of snow-covered passes. Such meticulous planning produced complete surprise - the fortress fell rapidly, at minimal cost of just 28 Russian casualties. This success did not, of course, vindicate the escalades of earlier campaigns - rather, it demonstrated that such assaults could succeed only under highly controlled conditions when preparation, intelligence, and surprise replaced improvisation.

Taken together, the Danubian and Caucasian campaigns reveal the centrality of siege warfare in the Russo-Ottoman War. Fortresses dictated operational possibilities, consumed manpower, and exposed the tensions within military doctrine. They forced commanders to move beyond the binary of battle and march, integrating multiple forms of warfare into a coherent strategy. Above all, they demonstrated that siege warfare in the Napoleonic age was never merely technical. It was shaped by institutional culture and ethos, personal ambition, logistics, political imperatives, disease, and geography. In this conflict, perhaps more clearly than in most, the fortress remained the unavoidable evil of Clausewitzian description, one that demanded not only courage to confront, but patience and wisdom to overcome.

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The Russo-Swedish War of 1808–1809 offers a revealing case study of the role of fortresses in the Napoleonic era. In a peripheral theater marked by immense distances, sparse population and infrastructure, and extreme winter conditions, the possession of fortified coastal nodes determined whether military operations could be sustained at all. Unlike the great campaigns of Central Europe—where mass armies maneuvered in search of decisive battle—the struggle in Finland revolved around Sweden's ability to sustain its fortress system in the borderlands.

Following the Russian invasion in February 1808, Swedish King Gustavus IV Adolf directed Count Wilhelm Mauritz Klingspor to withdraw Swedish forces northward into Ostrobothnia, avoiding decisive engagement with a numerically superior enemy. This retreat formed part of a coherent, if ultimately

fragile, strategic design. Swedish resistance was to be anchored in a network of fortified coastal strongholds—above all Sveaborg and Svartholm—which, strongly garrisoned and provisioned, were expected to fix substantial Russian forces throughout the winter. With the arrival of spring and the reopening of the Baltic Sea, the Swedish fleet would intervene, relieve the fortresses, sever Russian maritime communications, and enable a counter-offensive against the overextended enemy.[23]

At the center of this system stood Sveaborg, the immense maritime fortress complex guarding Helsinki—long regarded as the "Gibraltar of the North."[24] Garrisoned by approximately 7,000 men under Admiral Karl Olof Cronstedt and stocked with provisions sufficient for many months, it appeared well positioned to fulfill its role. Yet the unusually severe winter of 1808 fundamentally altered the nature of siege warfare. The freezing of the Baltic Sea nullified Sveaborg's greatest natural defense—its insularity; what should have been a protective moat became a frozen avenue of approach. Russian forces advanced across the ice, encircling the fortress and emplacing batteries in positions that would have been inaccessible under normal conditions. Count Fedor Buxhöwden, commanding Russian forces, recognized the strategic necessity of reducing Sveaborg quickly but faced significant logistical limitations. The transport of heavy artillery from St. Petersburg across snowbound terrain proved slow and arduous, while the rocky ground surrounding the fortress rendered conventional siegeworks difficult, if not impossible.

Deprived of the means for a methodical Vauban-style reduction, the Russians turned instead to a strategy of limited bombardment combined with psychological pressure. Under General Peter Sukhtelen, Russian artillery maintained a steady fire, intended less to inflict physical destruction than to erode morale. Cronstedt's response exacerbated the situation. His expenditure of powder in ineffective counter-battery fire weakened his material position while reinforcing a sense of vulnerability within the garrison. More decisive still was the systematic

23 For an excellent overview see Eirik Hornborg, *The Kingdom Torn Apart: The Finnish War of 1808-1809*, translated by Erik Faithful (Warwick UK, 2026).

24 Göran Rydén and Holger Weiss, "Sveaborg and the End of the Swedish Cosmopolitan Eighteenth Century" in Göran Rydén, ed. *Sweden in the Eighteenth-Century World* (London, 2016), 325-334.

exploitation of isolation. Russian forces disseminated false reports of victories elsewhere in Finland, intercepted communications with Stockholm, and staged visible preparations for an imminent assault, including the conspicuous display of scaling ladders upon the ice. To these pressures was added a more direct instrument: bribery. Buxhöwden employed secret funds to influence individuals within the fortress, a practice later described by Count Aleksey Arakcheyev as the use of "golden gunpowder."

Under the cumulative weight of uncertainty, isolation, and perceived inevitability, Cronstedt entered into negotiations and agreed to a convention stipulating that Sveaborg would surrender if not relieved by a Swedish fleet by early May. The condition, though formally reasonable, was impossible in practice as the Baltic remained frozen and no relief could arrive. On 8 May 1808, Sveaborg capitulated. The scale of the loss was immense: over 7,500 prisoners, nearly 2,000 artillery pieces, vast stores of ammunition, and more than one hundred vessels fell into Russian hands. The fall of Sveaborg – celebrated in St. Petersburg - constituted a decisive strategic rupture that deprived Sweden of its principal naval base in Finland, shattered the coherence of its defensive system, and precipitated the rapid collapse of other positions, including Svartholm and Tavastehus, decisively shifting the balance of power in favor of Russia.

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In the aftermath of the catastrophic Russian campaign—which cost Napoleon upward of half a million men between June 1812 and January 1813—the strategic dynamic in Central and Eastern Europe also underwent a major change. Refusing to abandon his eastern positions entirely, Napoleon adopted a defensive expedient built around a fortified forward system. The Oder-Elbe line—secured by major fortresses such as Magdeburg, Torgau, and Wittenberg—offered the framework for an "offensive-defensive" system. By holding permanent river crossings, Napoleon sought to impose asymmetry upon his adversaries: Allied armies, dependent on temporary bridging, would expose themselves to disruption, while French forces, issuing from fortified bridgeheads, could strike rapidly and withdraw under protection. At the center of this system stood Dresden, envisioned not simply as a fortress but as a vast entrenched camp and advanced logistical hub. The reconstruction of its defenses on both banks of the Elbe, sup-

ported by the commanding rock-fortresses of Königstein and Lilienstein, transformed the city into a strategic pivot. From this position, Napoleon could shield his communications, secure his magazines, and maneuver between the converging Allied armies of Bohemia and Silesia. Further north, Hamburg—held with uncompromising determination by Marshal Louis-Nicolas Davout—performed a similarly critical function. It denied the Allies direct maritime access, preserved France's tenuous connection to Denmark, and served as a northern bastion whose influence far exceeded its isolation.[25]

Yet the very system that afforded Napoleon temporary operational leverage also contributed to his strategic ruin. In order to maintain his presence in Central Europe, delay the Allied advance, and preserve the illusion of a future counter-offensive toward the Vistula, he immobilized tens of thousands of troops within the fortresses of the Oder and Vistula. He did at one point contemplate a bold maneuver via Havelberg to relieve Stettin and recover as many as 80,000 veteran troops for his field army, but the plan was never executed. Instead, the great eastern fortresses—Danzig, Stettin, Glogau, and Küstrin—remained potent yet inert reservoirs of manpower. By contrast, the Allied response proved strategically decisive. Adopting the Trachenberg-Reichenbach plan in the summer of 1813, they resolved to avoid costly assaults and instead mask and blockade the French strongholds. This preserved Allied field strength while steadily eroding Napoleon's. The consequences became evident at Leipzig, where Napoleon—having stubbornly retained Magdeburg, Torgau, Wittenberg, and other fortresses—faced the Allies without tens of thousands of experienced troops who might have altered the outcome. Cut off from relief, these garrisons endured prolonged blockades under some of the harshest conditions imaginable. The winter of 1813–1814 proved especially lethal as disease—above all typhus—spread rapidly through overcrowded and unsanitary quarters, while shortages of food and fuel sapped both strength and morale. At Torgau, which was blockaded from October 1813 to mid-January 1814, the toll was catastrophic: of the initial 25,000 French garrison, over 13,000, including garrison commander General Louis de Narbonne-Lara, perished through disease and deprivation. Danzig presented a similarly harrowing spectacle. Defended by General

25 For the best treatment of the German Liberation Wars, see Michael V. Leggiere, *Napoleon and the Struggle for Germany* (Cambridge, 2015), 2 volumes.

Jean Rapp almost a year (16 January 1813 to 2 January 1814), the garrison held out with determination, but as supplies dwindled, conditions deteriorated into desperation - horses were slaughtered, followed by dogs and cats; even these measures proved insufficient. Over half of its 36,000 garrison (and thousands more civilians) died before the fortress finally capitulated.

The siege of Hamburg (December 1813-May 1814) stands as one of the most revealing—and grim—examples of fortress warfare in the final phase of the Napoleonic Wars. Unlike many of the isolated strongholds scattered across German and Polish countryside, Hamburg was a major commercial city, a political symbol, and a strategic hinge between land and sea. Its defense under Marshal Louis-Nicolas Davout transformed it into a formidable bastion of French resistance in northern Germany, even as it became a site of prolonged suffering for both soldiers and civilians. Situated along the lower Elbe, the city controlled access between the North Sea and the interior of northern Germany. Retaining it, thus, served multiple strategic purposes: it denied the Allies a major port, disrupted British maritime operations along the German coast, and preserved a tenuous connection to Denmark, one of Napoleon's last remaining allies in the region. In the broader context of the 1813 campaign, Hamburg formed the northern anchor of the French defensive system, complementing the chain of fortresses along the Elbe and Vistula. Davout, Napoleon's most capable and disciplined marshals, assumed command of the city with characteristic rigor. Recognizing both its strategic value and its vulnerability, he undertook extensive measures to transform Hamburg into an impregnable fortress. The surrounding suburbs were cleared to create fields of fire, fortifications were strengthened, and large quantities of supplies were requisitioned, at great cost to the local population. In an act that underscored both his determination and his ruthlessness, Davout expelled tens of thousands of civilians from the city during the winter of 1814, seeking to conserve provisions and reduce the burden on his garrison; many of those expelled perished in the cold, a stark testament to the human cost of fortress defense.

The siege itself, conducted by Russian, Prussian, and Swedish forces, was characterized less by dramatic assaults than monotonous blockade. The Allies, mindful of the heavy casualties incurred in earlier siege operations, chose to isolate Hamburg rather than storm it. Cut off from reliable supply, the garrison

endured months of increasing privation. Food grew scarce, fuel dwindled, and disease spread through the crowded quarters of soldiers and remaining civilians. Despite these conditions, Davout maintained iron discipline. His refusal to capitulate, even as the broader French position in Germany collapsed following Napoleon's defeat at Leipzig, reflected both personal resolve and adherence to Napoleon's directive that fortresses must be held to the utmost. Hamburg thus became an anomaly: a fortress continuing to resist long after the strategic framework that justified its defense had disintegrated. The fortress held through the winter, the fall of the French Empire's positions elsewhere, and even through Napoleon's abdication in April 1814; only after receiving instructions from the new French government did Davout finally agree to evacuate the city.[26]

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By the winter of 1813–1814, as Allied armies crossed the Rhine, the strategic function of fortresses shifted once again. France itself was shielded by an immense belt of fortified places stretching across its eastern and northern frontiers. Napoleon conceived of this network as a vast defensive screen behind which he might rebuild a field army from the exhausted resources of the state. If the fortresses held, the Allies would be forced to disperse their strength in sieges, exposing themselves to attrition and counterattack. At the same time, the fortresses of the "new France," particularly in the Low Countries and along the Rhine, carried symbolic weight as instruments of imperial prestige and diplomatic leverage.[27] Yet here again, scale proved fatal. The catastrophic losses of the preceding campaigns left Napoleon without the manpower necessary to sustain both fortress garrisons and a viable field army. The result was a hollow system: garrisons composed of conscripts, National Guardsmen, and invalids; fortifications inadequately supplied; and a field army too weak to impose decisive resistance. What had been conceived as a shield became an immeasurable

26 See Frank Bauer, *Hamburg 1813/1814: Kampf und Leiden einer Stadt* (Potsdam, 2010); On civilian experiences see Katherine Aaslestad, "Post War Cities: The Cost of the Wars of 1813-1815 on Society in Hamburg and Leipzig," in Alan Forrest, Karen Hagemann, and Michael Rowe, eds., *War, Demobilization, and Memory: The Legacy of War in the Era of Atlantic Revolutions* (Basingstoke, 2016),220-235.

27 For discussion see Michael Leggiere, *The Fall of Napoleon*. Volume 1: *The Allied Invasion of France, 1813-1814* (Cambridge, 2017).

burden, absorbing strength without yielding strategic advantage.

Recognition of this fundamental weakness provoked a critical debate within the Allied high command. Austrian commanders advocated a cautious and methodical approach: the systematic reduction of the French frontier fortresses before any advance into the interior. To them, leaving strongholds such as Mainz, Metz, or Strasbourg in the rear risked exposing the army's communications and inviting operational disaster. In contrast, Prussian strategists—most notably August von Gneisenau—grasped the altered strategic reality of 1813–1814. Napoleon's acute shortage of manpower had transformed the fortress system from a source of strength into a latent vulnerability. Rather than dissipating their forces in protracted sieges, Gneisenau argued that the Allies should advance through the intervals between the fortresses, bypassing them altogether and carrying the war directly into the French interior; the garrisons, isolated and increasingly irrelevant, could be contained by secondary forces without compromising the main effort. The Prussian opinion ultimately prevailed and this decision proved decisive to the outcome of the war. By privileging speed over method and maneuver over reduction, the Allies avoided the attritional trap that Napoleon had hoped to impose. Their rapid advance toward Paris forced the emperor into a strategic dilemma he could not resolve and ultimately precipitated the collapse of his regime.

The enduring significance of fortresses did not disappear with Napoleon's defeat; rather, it was formalized and embedded within the postwar European security order. In the aftermath of two decades of almost uninterrupted conflict, the victorious powers concluded that the abstract principle of the balance of power required a concrete, physical embodiment - the so-called "Wellington Barrier." Financed in part by French indemnities and organized under the supervision of the Duke of Wellington, the barrier consisted of twenty-one modernized and newly constructed fortresses arrayed along three parallel lines. The defensive line began at the North Sea coastal strongholds of Nieuwpoort and Ostende, wound through vital Low Country nodes such as Dendermonde, Ath, Doornik, Oudenaarde, Gent, and Dinant, and terminated at the defensive lines at Mainz on the Rhine. Wellington, who served as the unified commander of the multinational occupation forces in France, frequently travelled from his headquarters in Cambrai or Paris to the Netherlands to personally inspect the construction and

expansion of this massive defensive network which was completed by the end of 1818. This vast system served a dual purpose: strategically, it constituted a formidable barrier against any renewed French expansion, a line of resistance designed to absorb and blunt future aggression. Politically, it functioned as a material bond linking the powers of the Quadruple Alliance in a shared commitment to collective security. The fortress, once a localized instrument of defense, was thus transformed into a cornerstone of Europe's new security order.[28]

28 Beatrice de Graaf, *Fighting Terror after Napoleon: How Europe became Secure after 1812* (Cambridge, 2020), 357-426; Beatrice de Graaf, Brian Vick, and I. de Haan, eds. *Securing Europe after Napoleon: 1815 and the New Security Order* (Cambridge, 2019).

"By Regular Approaches"? Petersburg 1864

by Ethan S. Rafuse
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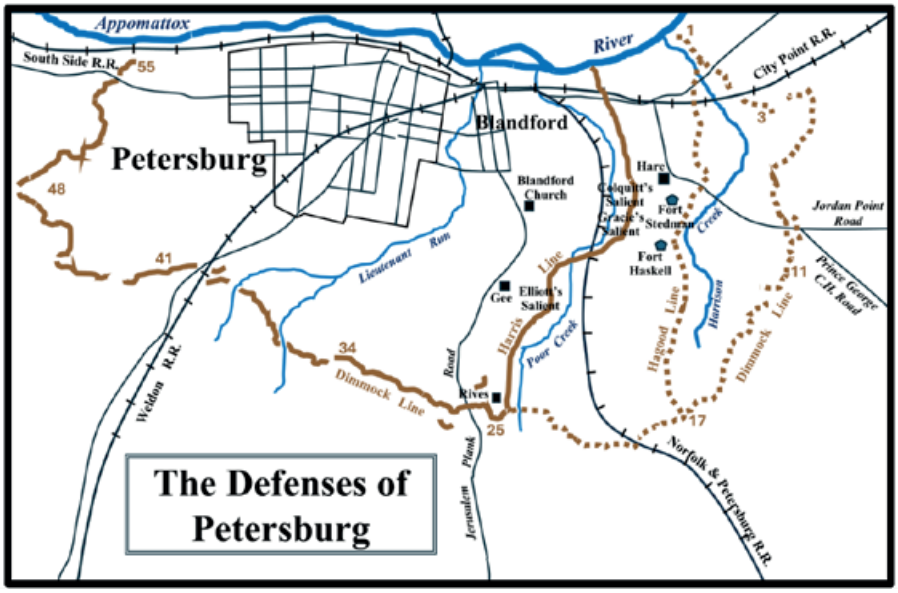
"The saddest affair I have witnessed in the war," was Lt. Gen. Ulysses S. Grant's verdict on the infamous failed assault of July 30, 1864, that became known as the Battle of the Crater. "Such opportunity for carrying fortifications I have never seen and do not expect again to have."[1] In the weeks that followed, those seeking an explanation for the fact that the Confederates remained defiant and securely held the fortified lines that protected the vital river and railroad town of Petersburg, Virginia, focused their attention on the high command of the Ninth Corps. Much to the relief of many, the aftermath of the fight at the Crater saw Maj. Gen. Ambrose Burnside's unhappy military career come to an effective end, as did the careers of a number of his subordinates. Meanwhile, a grueling, grinding campaign for Petersburg continued. Not until April 1865, after over a half-dozen separate offensive operations, mainly focused on the roads and rail lines that connected Petersburg with the Carolinas, would Grant finally be able to claim possession of the Cockade City.

Did it have to be this way? It is not unreasonable to conclude that, if the remarkably innovative approach to the problem of the Petersburg defenses the coal miners of the 48th Pennsylvania came up with that produced the opportunity at the Crater could not achieve success, then the campaign for Petersburg was doomed to be a test of endurance that would be determined by which side could outlast the other. Even a general as able as Grant, facing the stalwarts that manned Gen. Robert E. Lee's Army of Northern Virginia and the impressive system of trenches Confederate engineers had constructed to protect Petersburg, really had little alternative but to pursue a time-consuming operational approach

1 Grant to Halleck, August 1, 1864, in *The Papers of Ulysses S. Grant*, edited by John Y. Simon. 31 vols. (Carbondale: Southern Illinois University Press, 1967-2012), vol. 11: 361.

whose objective was to render the Confederate position at Petersburg untenable by wresting control of the roads and rail lines that led into the town and sustained Lee's command, rather than attempting to take on the fortifications defending the town directly by assault.



Yet, there was in fact another alternative available to Grant in 1864; namely, of targeting the Confederate defenses directly by using regular siege approaches. This method is what western armies had been doing for hundreds of years prior to 1864 when confronted by an enemy using fixed fortifications to defend an important point on the map—and for good reason. When done properly, regular siege approaches had a long and proven track record of producing the desired effect of compelling an enemy to give up pieces of ground that were vital to the defense of a strongly fortified fixed point on the map. This essay will consider the feasibility of such an approach and the reasons Grant, who at one point was in fact tempted to do so, did not take it.

Offensive siege warfare was a highly formalized way of war that emerged as a consequence of revolutionary alterations in fixed fortifications made by Italian engineers in response to improvements in artillery whose devastating effects were evident in the Italian Wars of the late fifteenth century and early sixteenth century. Its centrality in military thinking in western Europe was evident in the

seventeenth century, when the French engineer Sebastian de Vauban was recognized as its great theorist and practitioner and continued well into the eighteenth century, with even great battlefield commanders like the Duke of Marlborough and Maurice de Saxe employing siege operations.

The "system of attack" for taking fortresses, most closely associated with Vauban and a manifestation of the influence of the cult of reason, geometry, mechanical philosophy, order, and science of the late sixteenth and early seventeenth century on war, first entailed identifying a piece of terrain that was crucial to the defending force's line. Then, one methodically digs trenches forward from one's own fortified line (the technical term is "sapping") toward that point under the cover of one's own artillery. This was done in zig-zag patterns so that the enemy could not simply position its artillery or infantry in a way that would enable them to fire down the entire length of the trench. After covering a carefully calculated distance that kept them within range of one's own original artillery line so as to be able to thwart any attempt by the enemy to disrupt the process by launching a counterattack, the sappers halted their forward progress. They then dug earthworks connecting the saps and constructed artillery positions that would be strongly fortified in order to protect them from enemy artillery and small arms fire. Artillery would be brought forward and posted in a line of batteries, connected by earthworks, that paralleled those of the point of attack and thus was known in the parlance as a "parallel". The batteries in this parallel, ideally situation to place a converging fire on the point on the enemy's line designated for attack, would provide cover to sappers as they dug forward again to establish another parallel. The process would then be repeated until a parallel had been established close enough and so situated that the artillery could bombard the vital enemy position with such effect that the enemy would have no choice but to abandon it. If the enemy chose to continue to resist, the artillery would at least be able to cover the sappers as the process was repeated until the artillery was close enough to destroy the enemy's lines, induce the enemy to abandon the position, or support the infantry when it made an assault, which would be launched at a close enough range that, in combination with the destruction inflicted by the artillery, it had every prospect of achieving success.[2]

2 Henry Guerlac, "Vauban: The Impact of Science on War," in *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*, edited by Peter Paret et al (Princeton, NJ: Princeton University Press, 1986), 68-73, 79-80. Jamel Ostwald provides a description of the process

When properly applied by a force that enjoyed superiority in artillery (as the Federals did at Petersburg) and had the time to prepare and execute them, offensive siege operations were difficult to resist. Indeed, one of the reasons the construction, defense, and capture of fortified positions through siege operations occupied such a central place in Western warfare, and engineers and artillerists enjoyed unmatched status in Western armies, was its methodical, scientifically predictable character. It was a matter of calculating distances, the amount men could dig on a particular day, and the geometric relationship of the parallels to the respective positions of each army. Moreover, because it required mathematical knowledge and skills that could only be mastered through long-term study, it was the engineers that were the first to develop a sense of service in the military as a profession, were really the first segments with armies that could claim professional status, and thus enjoyed great prestige.

As a graduate of the U.S. Military Academy at West Point, whose curriculum and culture were dominated by engineering and the academic disciplines that underpinned it, Grant was quite familiar with the role a sustained program of regular siege approaches could play in his operations. His persistent efforts to find a place for William B. Franklin, whose engineering prowess had enabled him to graduate first in Grant's class at West Point, suggest that, contrary to the impression he tried to create in his memoirs of having a decidedly jaundiced view of the military academy, Grant in fact respected and appreciated the value of engineers and the training they received at the academy. So did his efforts to ensure Franklin's friend and fellow engineer William F. "Baldy" Smith would have an important command in 1864, which were a consequence of Grant being impressed by Smith's work as an engineer in East Tennessee. Moreover, Grant held a high opinion of Smith's and Franklin's abilities despite their less-than stellar performance as division and corps commanders in 1862 contributing ammunition to those in the North who had a jaundiced view of engineers.[3] Moreover, among those prominent in the high commands of the armies under Grant's

by which "Vauban brought his siege attack to perfection" in 1697 at Aft in *Vauban Under Siege: Engineering Efficiency and Martial Vigor in the War of the Spanish Succession* (Leiden: Brill, 2007), 21-46.

3 Brooks D. Simpson, *Ulysses S. Grant: Triumph over Adversity, 1822-1865* (New York: Houghton Mifflin, 2000), 246, 250, 357, 359.

command in 1864 were men with West Point and engineering experience like Smith, George G. Meade, Quincy Gillmore, and Gouverneur K. Warren. Many of these men owed their positions in no small part to Maj. Gen. George B. McClellan, a distinguished West Point graduate who was widely respected for his talents and accomplishments as a military engineer, who had especially valued engineers when he built the Army of the Potomac, selected and shaped its officer corps, and planned and conducted operations during the first year of the war.

Moreover, Grant had a section of the Confederate line at Petersburg in 1864 where the conduct of regular siege approaches was, if not perhaps optimal, at least feasible and might well have produced decisive results. This was the portion of the Confederate fortified line south and east of Petersburg behind which was a piece of high ground known as Well's or Cemetery Hill on which the community of Blandford was located. Separating Lieutenant Run to the west from Poor Creek to the east, this elevation was the highest point in Petersburg and where historic Blandford Church had been constructed in 1736. The military significance of the hill had been evident in April 1781, when militia commanded by Maj. Gen. Baron von Steuben and Peter Muhlenberg had chosen the high ground at Blandford for what proved to an unsuccessful defense of the military depot at Petersburg against British forces commanded by Brig. Gen. William Phillips and Benedict Arnold.

Cemetery Hill had been the objective of the assault at the Crater, with Union forces directed to immediately push through the hole in the Confederate lines created by the explosion of the mine, then swing north to seize the hill. Unfortunately, leadership failures in the execution of the plan resulted in Union forces getting bogged down after reaching the Crater and gave the Confederates enough time to first contain the Union penetration, then launch counterattacks that drove the Federals back to their original lines.[4] In addition to being high ground, the Jerusalem Plank Road crossed Cemetery Hill. Running south and east from Petersburg behind the Harris Line to where it turned west at Rives Salient, the Jerusalem Plank Road (modern Crater Road) was critical for the movement of troops defending Petersburg. Consequently, if the Federals could

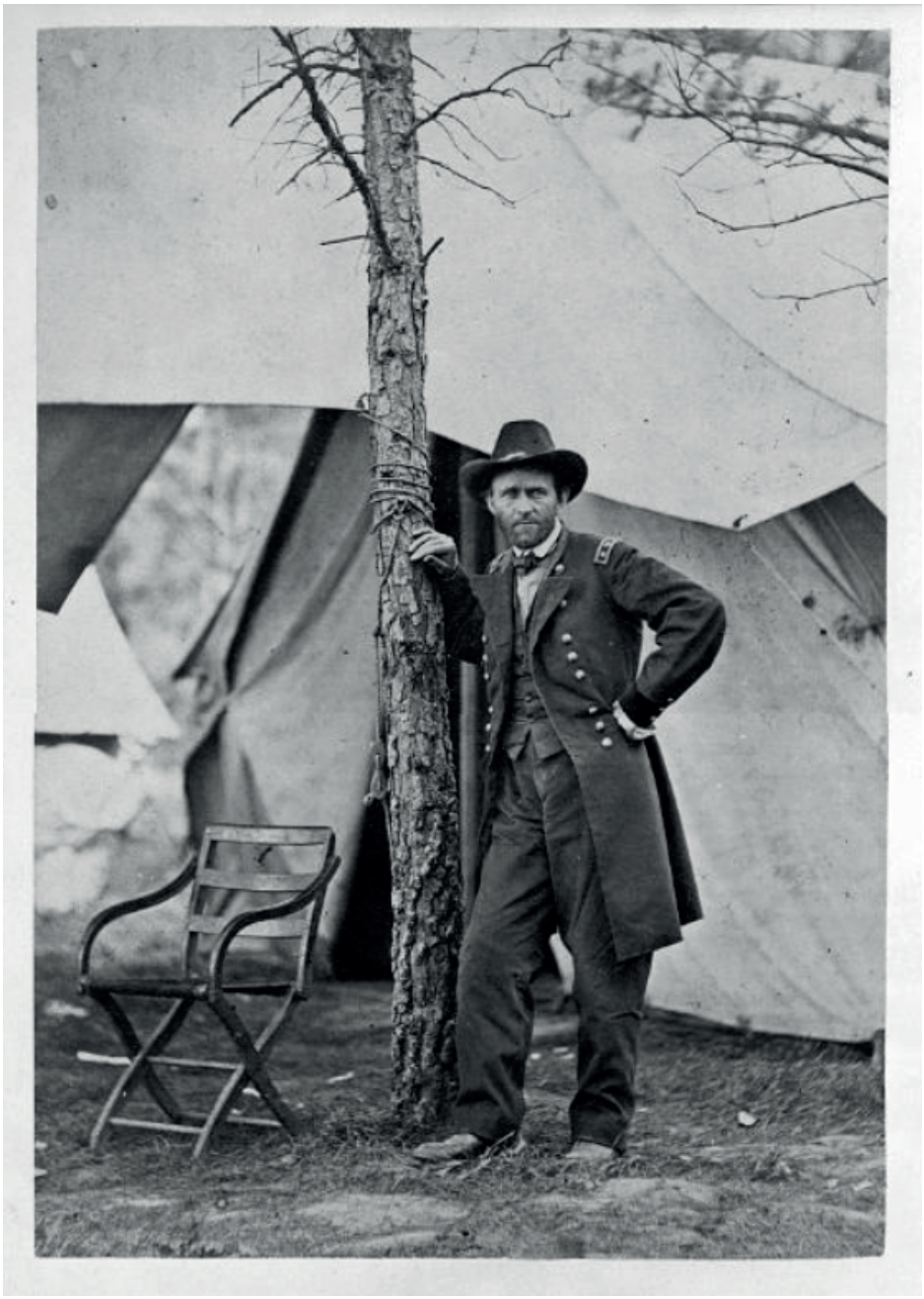
4 For the Crater battle, see Greene, *A Campaign of Giants*, 419-505; Edwin C. Bearss, *The Petersburg Campaign: Volume 1: The Eastern Front Battles, June-August 1864* (El Dorado, CA: Savas Beatie, 2012), 204-36; Earl J. Hess, *Into the Crater: The Mine Attack at Petersburg* (Columbia: University of South Carolina Press, 2010).

seize a point on the Jerusalem Plank Road at or near Cemetery Hill, it would, at the least, compromise the entire Confederate line south of the Appomattox River. Gaining possession of Cemetery Hill itself would have placed the Federals on high ground whose closeness to Petersburg would have for all intents and purposes rendered the town and its defenders at the mercy of the Union army.

When the Union attack on Petersburg by Grant's command began on June 15, 1864, the town was protected by the ten-mile long fortified Dimmock Line and its fifty-five batteries, which had been laid out in August 1862 and constructed employing slave labor. After Union assaults on June 15 compelled the Confederates defending Petersburg commanded by Gen. Pierre G.T. Beauregard to abandon the section of the Dimmock Line east of Petersburg from Battery 3 to Battery 11, they pulled back to a line behind Harrison's Creek known as the Hagood Line. After fighting on June 16 and 17, Beauregard pulled his command back early on June 18 to a third line, which became known as the Harris Line. This line, where on June 18 Beauregard's command welcomed the arrival of reinforcements from Gen. Robert E. Lee's Army of Northern Virginia, ran north from Battery 25 in the Dimmock Line, which was just east of the Jerusalem Plank Road. At Battery 25, the Harris Line rejoined the Dimmock Line and marked the point the defenses of Petersburg turned westward, creating what became known as Rives's Salient, which was one of the points the Federals attacked unsuccessfully on June 18.[5]

Thus, in late June 1864 the distance between Cemetery Hill and Blandford Church and the section of the Union line facing west where the Federals established strong points that came to be known as Fort Stedman, which occupied the crest of what was known as Hare's Hill, and Fort Haskell, was only about a mile. Between the Federal lines and Cemetery Hill the Confederates occupied defensive positions in the Harris Line between two and three hundred yards east of Poor Creek, which was a little over thirteen hundred yards east of Blandford Church, whose main features became known as Colquitt's and Gracie's Salients. The distance between Fort Stedman and the salients was only about three hun-

5 A. Wilson Greene, *A Campaign of Giants: The Battle for Petersburg, Volume 1: From the Crossing of the James to the Crater* (Chapel Hill: University of North Carolina Press, 2018), 74-212; Earl J. Hess, *In the Trenches at Petersburg: Field Fortifications and Confederate Defeat* (Chapel Hill: University of North Carolina Press, 2009), 11-14, 19-20, 22, 27-30, 36.



Lt. Gen. Ulysses S. Grant at Cold Harbor, Virginia, June 1864 (Library of Congress)

dred yards. Consequently, pushing regular siege advances forward from Fort Stedman far enough forward to post Federal artillery at point-blank range from which it could render the Confederate line there untenable, even while taking proper precautions to protect the Federal engineers and soldiers as they worked, could hardly have been a matter of more than a few weeks, if that long.

Once the Confederates occupying Colquitt's and Gracie's salient faced the prospect of an irresistibly powerful concentration of Federal artillery at close-range, they had only a series of bad options available to them. One would be to attempt to disrupt the work of the Federal engineers by concentrating their own artillery. This was a game, though, that the Federals, with their superior material strength, could play much more effectively. Moreover, to concentrate an adequate force to match the Federals, the Confederate high command would have been compelled to dangerously weaken other parts of the line. Another option would be to launch a counterattack—known in technical terms as a "sortie"—to try to disrupt the construction of regular siege approaches. Yet there were few things that the Union high command would have welcomed more in 1864 than an opportunity to engage the Confederates when they were out of their trenches and exposed to the full weight of well-prepared Union artillery and small arms fire delivered from behind the protection of the North's own well-engineered fortifications.

The final option would be to fall back behind Poor Creek and the Norfolk and Petersburg Railroad to a line closer to Cemetery Hill. This would, however, have unhinged the section of the Confederate line that ran south from Gracie's Salient toward Elliot's Salient, the site of the Crater battle. This would in turn have invariably compelled the Confederates occupying that section of the line to withdraw west—with the Federals pushing forward to take advantage. This would have the effect of bringing the Federals so close to the Jerusalem Plank Road in the vicinity of the Gee House from which Lee and his subordinates managed the fight at the Crater that the road would be for all intents and purposes unusable for Confederates.

At that point the Federals, after consolidating their new line, could repeat the process and continue pushing forward. If a direct approach to cover the thirteen hundred yards from Poor Creek to Cemetery Hill proved problematic, at least the Federal lines could be pushed forward far enough to secure a strong lodgment on the Jerusalem Plank Road just south of the hill. With the Federals

having thus driven a deep wedge in the Confederate lines, if not shattered them altogether, around the Gee House, the section of the Confederate defensive line that ran south from there to Rives' Salient would have been rendered highly precarious, if not completely untenable. The Federals would also be able to subject the salient created at Cemetery Hill to a cross-fire of artillery that could cover a final approach to the hill. By compelling a dramatic contraction of the Confederate line, such an operation could have also facilitated the task of completing the investment of Petersburg by extending Federal lines to the Appomattox River west of the town.

To be sure, in light of the element of contingency that is always present in military operations, there is considerable hazard in engaging in an exercise in counterfactual history such as this one. Yet, given the advantages in numbers, artillery, and engineering skill the Union army possessed, it is difficult to see how the Confederates could have successfully resisted for long a methodical and prudently managed campaign of regular siege approaches conducted along these lines. At the very least, a focused concentration of Federal force in this manner would have given Lee and his subordinates no choice but to diminish positions in front of Richmond, Bermuda Hundred, and elsewhere around Petersburg to the point that their ability to deal with Federal efforts in those places would be significantly, perhaps fatally, compromised. Indeed, no less than Gen. Pierre G.T. Beauregard, expressed astonishment that the Federals had not undertaken regular siege approaches. Had they done so, Beauregard declared after the war, "We might have resisted a few weeks." Whatever else may be said about Beauregard, there were few officers on either side in the Civil War who were more respected for their military engineering acumen than Beauregard—and for good reason. After graduating second in his class at West Point in 1838, the Creole won praise for his performance as an engineer as a member of Maj. Gen. Winfield Scott's staff during the campaign that captured Mexico City and on projects in Louisiana, Florida, and Alabama during the 1850s. The widespread respect his abilities merited was further evident in his appointment as superintendent at West Point and performance successfully directing the defense of Charleston, South Carolina, in 1863 and Petersburg in 1864. Beauregard, declared after the war, "We might have resisted a few weeks."[6]

6 "Notes of Genl. Beauregard on W.J. Marrin's Acct. of the explosion of the Federal Mine at Petersburg Va. July 30th 1864," quoted in Hess, *In the Trenches at Petersburg*, 44.

In light of all of this, it must be fairly asked, why did Grant not demonstrate more interest in or pursue more vigorously regular siege approaches?

It certainly made sense for Grant to first see if he could find another, quicker way to crack the Petersburg nut after the failure of the offensive against the town on June 15-18, 1864. Consequently, only a few days after the failed assaults of June 18, he decided to continue his pattern in 1864 of trying to turn the Confederate position operationally by moving to the left with an eye on the lines of communication that supported Lee's command. This would, he hoped, result in the Federal army gaining possession of Confederate communications, Lee being compelled to come out of his strong defensive position and fight in the open field, or, ideally, both. Unfortunately, Grant's effort was no more successful in achieving the decisive results he hoped for than his previous efforts along these lines against Lee's army. Two corps were able to push across the Jerusalem Plank Road and extend the Union line beyond it, but could not establish a permanent foothold on the Weldon Railroad that ran south from Petersburg to Goldsboro, North Carolina. Worse, the Confederates were able to launch a counterattack into a gap that opened between the two corps on June 22 that captured 1,700 prisoners.[7]

With the failure of this offensive and a cavalry raid that returned to the Petersburg defenses on July 1 having inflicted only temporary damage on Confederate logistics and ended with Union raiders having taken a bad beating in fighting at Reams' Station on the Weldon Railroad, Grant briefly authorized preparations for regular siege approaches. On July 2, engineer officer Brig. Gen. John G. Barnard submitted a memorandum arguing that the failure to seize the Weldon Railroad left the army "lying without any definite objective". Two corps, he observed, were at that time "lying in trenches close up to the enemy, carrying on a quasi-siege—not decided enough to accomplish anything, but by heat and sharpshooters losing men every day" while the rest of the army "stretched out in a line, which neither supports the other two, or is supported by them, or controls the enemy's communications."

As Barnard saw it, something had to be done—and soon—for he thought with the summer heat bearing down on the Union army the situation could be

7 Greene, *A Campaign of Giants*, 230-56; Bearss, *The Petersburg Campaign*, 132-91.

endured "for a few days, but not for several weeks." The place to accomplish something, he believed was where Union forces were "close up to the plateau, or ridge, over which the Jerusalem road enters Petersburg. If we can gain that plateau I do not believe Petersburg can be held any longer." To do so by "merely ordering corps commanders 'to assault'," he declared a useless endeavor. Rather he believed the task could be accomplished with "reasonable certainty" by "most careful arrangements . . . and, above all, the powerful concentration of artillery. . . . brought into position, suddenly and open fire, and keep it up until the enemy's fire is silenced; 100 guns should be used; the mortars near the salient to keep up fire until our troops reach the rebel lines" with two corps massed to follow up and seize the designated ground.[8]

Grant responded positively to Barnard's suggestion and directed Army of the Potomac commander Maj. Gen. George G. Meade to look into it. On July 4, Meade wrote to Grant that, after considering the matter with his corps commanders, he was "satisfied an immediate assault on the enemy's line in my front is impracticable." Maj. Gen. Ambrose Burnside, whose corps held the section of the Union line south and east of Cemetery Hill opposite the part of the Confederate line known as Elliot's Salient, had already been given the green light to execute the proposal of Henry Pleasants's Pennsylvanians to dig a mine, which was to be used to position a large quantity of explosives under the salient and blow it up. If the mine worked, Burnside would make Cemetery Hill the objective of his forces once they took advantage of the hole created in the Confederate line. Meade advised Grant of Burnside's mining operation, but the novelty of the plan—and the fact that Pleasants's men would have to dig a considerable distance to reach the point under the Confederate lines where it could achieve the desired effect made it a formidable engineering challenge that it was by no means certain could be overcome—meant there was good reason to be skeptical about its feasibility. Consequently, Meade was convinced that, "The only plan to dislodge the enemy from this line is by a regular approach."[9]

Grant accepted Meade's take on the situation and what could and should be done. "The best we can do now," he advised Meade on July 5, "is to strengthen our present lines on Burnside's and Warren's front and advance by gradual

8 Barnard, "Memorandum," July 2, 1864, OR, vol. 40, pt. 2: 584-85.

9 Meade to Grant, July 4, 1864, OR, vol. 40, pt. 2: 620-21.

approaches as you propose."[10] The following day, the Army of the Potomac's chief of artillery Brig. Henry J. Hunt and chief engineer Maj. James Duane likewise concluded in a report that in light of the fact that the enemy's fortifications had been "very much strengthened . . . regular approaches must, therefore, be resorted to." They warned though, that, "It is probable the siege will be a very long one, inasmuch as one line of works is carried another equally strong will be found behind it, and this will continue until the ridge is attained which looks into the town."[11] Nonetheless, on July 9, Meade won approval from Grant to issue orders directing that "operations of this army against the intrenched position of the enemy defending Petersburg will be by regular approaches on the fronts opposed to General Burnside's and General Warren's corps." A plan for carrying out this directive was submitted the following day and approved on the eleventh, "and it was ordered that the work be commenced at once."[12]

Grant's willingness to authorize regular approaches, it seems, was in part a consequence of his presumption that he would have sufficient force to undertake both regular siege approaches east of Petersburg and his own preferred method of conducting maneuver warfare to seize the roads and railroads south and west of Petersburg. When June 1864 ended, Grant had south of the Appomattox River the four corps of Meade's Army of the Potomac—Brig. Gen. Winfield Scott Hancock's Second Corps, Brig. Gen. Gouverneur Warren's Fifth Corps. Brig. Gen. Horatio Wright's Sixth Corps, and Maj. Gen. Ambrose Burnside's Ninth Corps—and Brig. Gen. William F. Smith's Eighteenth Corps from Maj. Gen. Benjamin Butler's Army of the James. On top of this, when July began Grant anticipated the arrival at the Richmond-Petersburg front of Brig. Gen. William Emory's Nineteenth Corps from Louisiana, which he had asked Washington to have sent on June 23, with the result that the very next day orders were dispatched to the commander of Union forces in Louisiana to assume the defensive and immediately send "all available white troops in the Department of the Gulf . . . to Fort Monroe, Va. . . . General Grant is of the opinion that the Nineteenth Corps, or its equivalent can be spared."[13]

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10 Grant to Meade, July 5, 1864, OR, vol. 40, pt. 3: 5.

11 Hunt and Duane to Humphreys, July 6, 1864, OR, vol. 40, pt. 1: 285.

12 Michler to Williams, October 20, 1864, OR, vol. 40, pt. 1: 292.

13 Grant to Halleck, June 23, 1864, OR, vol. 34, pt. 4: 514-15; Halleck to Canby, June 24, 1864, ibid., 528.

Unfortunately, problems elsewhere forced a reevaluation of the situation. On learning of the arrival of reinforcements from Lee's army commanded by Lt. Gen. Jubal Early at Lynchburg on June 17-18, the commander of Union forces in the Shenandoah Valley, Maj. Gen. David Hunter, decided to retreat west to the Kanawha Valley of West Virginia. This enabled Early to push Confederate forces north down the Shenandoah Valley and cross the Potomac River to enter Maryland near Sharpsburg on July 5. In response, Grant decided during the morning of July 5 to send the elements from Maj. Gen. Philip Sheridan's cavalry corps that were then dismounted and a division of infantry from Wright's Sixth Corps north from the Petersburg front, "which will be followed," Grant advised Washington, "by the balance of the corps, if necessary . . . to crush out and destroy any force the enemy have sent north."[14] As Early pushed his command toward Washington, Brig. Gen. James Ricketts's division from Wright's corps departed City Point and reached Maryland in time to be among the Union forces that were defeated by Early's command at the Battle of Monocacy on July 9. That night, Brig. Gen. David Russell's and Brig. Gen. George Getty's divisions from the Sixth Corps received orders to "move at once to City Point . . . to embark for Washington" the following morning. [15]

On July 10, the same day Russell's and Getty's divisions left City Point, the first elements of the Nineteenth Corps reached the waters of the Chesapeake Bay from Louisiana. If they thought they would be joining the fight against Lee's army, they were quickly disabused of the notion. The day before, Grant had authorized Halleck to order the Nineteenth Corps to Washington "if you deem it advisable." Halleck promptly deemed it advisable and by midnight on July 9 orders were in route to Fortress Monroe directing that, "Troops arriving from New Orleans will be sent immediately forward to Washington."[16]

Two days after its victory at Monocacy, Early's command reached Fort Stevens less than five miles from Lincoln's office in the Executive Mansion. By noon that day, however, Wright had personally reached Washington with, a War

14 Grant to Halleck, July 5, 1864, OR, vol. 40, pt. 3: 4.

15 Humphreys to Wright, July 9, 1864, OR, vol. 40, pt. 3: 106; C.H. Whittelsey Orders, July 9, 1864, ibid., 107-08; Grant to Halleck, July 10, 1864, ibid., 122.

16 Grant to Halleck, July 9, 1864, OR, vol. 40, pt. 3: 92; Halleck to Commanding Officer Fortress Monroe, July 9, 1864, ibid., 119.

Department official advising Grant that night that, "Five boat-loads of General Wright's troops have arrived, and one of the Nineteenth Corps" with Wright and his men promptly rushed forward to Fort Stevens.[17] Their arrival was sufficient to convince Early that he had accomplished all that he could at that point north of the Potomac. On July 13 Grant was advised of the Confederate retreat and that Wright had been sent forward with four divisions from his corps and Emory's to press Early's command as it pulled back to the Potomac crossing at Edwards Ferry.[18]

The following day, Grant, satisfied that Early had recrossed the Potomac and notified that the forces from Hunter's command that had retreated from Lynchburg a few weeks early had arrived on the scene from West Virginia, sent a message from City Point to Halleck stating his desire that Hunter's force take up the task of dealing with Early so that "the Sixth and Nineteenth Corps should be got here without delay." Grant qualified this by stating that he was willing to wait a while if Wright's command was at that moment "in pursuit of the enemy with any prospect of punishing him, but to secure his return at the earliest possible moment after he ceases to be absolutely necessary where he is."[19]

News that Early had recrossed the Potomac and that the force pursuing it under Wright's direction had only reached Poolesville, Maryland, on July 14, however, infuriated President Abraham Lincoln. When Early pulled back from Fort Stevens on July 12, he remarked to a staff officer that, while his command had failed to capture Washington, he was certain their efforts had "scared Abe Lincoln like h---!"[20] In fact, the president's response to the events of July was not fear of the enemy, with his secretary John Hay writing in his journal on July 11 that Lincoln was in fact "in very good feather this evening. He seems not in the least concerned about the safety of Washington. With him the only concern seems to be whether we can bag or destroy this force in our front." In the days that followed, though, Lincoln watched in frustration as the "great plenty of

17 Halleck to Grant, July 11, 1864, OR, vol. 37, pt. 2: 192; Dana to Grant, July 11, 1864, ibid., 193; Wright to Auger, July 11, 1864, ibid., 208.

18 Halleck to Grant, July 13, 1864, OR, vol. 37, pt. 2: 257-58; Dana to Grant, July 13, 1863, ibid., 259-60.

19 Grant to Halleck, July 14, 1864, OR, vol. 37, pt. 2: 300.

20 Henry Kyd Douglas, *I Rode With Stonewall* (Chapel Hill: University of North Carolina Press, 1940), 295-96.

Historic Blandford Church, Virginia (Library of Congress)

Generals," Hay recorded were in the capital, seemed incapable of fulfilling the president's wish to see them "push our whole column right up . . . and cut off as many as possible of the retreating raiders." Finally, when news arrived on July 14 of Wright's failure to march further than Poolesville at about the same time Grant notified Halleck of his wishes to have the forces he had sent to Washington at Petersburg, Hay recorded in his diary that Lincoln had sneered Wright had halted "for fear he might come across the rebels & catch some of them." "The Chief," Hay wrote, "is evidently disgusted."[21]

21 Entries for July 11, 13, 14, 1864, in *Inside Lincoln's White House: The Complete Civil War Diary of John Hay*, edited by Michael Burlingame and John R. Turner Ettlinger (Carbondale: Southern Illinois University Press, 1997), 221-23.

Confident that Hunter's force, which on July 15 was reported to be at Harpers Ferry, was sufficient "make all the Valley south of the Baltimore and Ohio Road a desert as high up as possible," Grant continued on July 16 to express hope that the Sixth and Nineteenth Corps would soon be back at City Point. The following day, Halleck issued orders directing that "all Sixth and Nineteenth Corps within reach" be directed "to re-embark for City Point."[22]

Simply compelling Early to fall back from Washington, however, was satisfactory to neither Lincoln nor Grant. The president was, needless to say, decidedly displeased with the management of affairs and demanded that more be done to avenge the embarrassment of having Confederate forces menace Washington and arouse fears that it might be captured with less than twenty thousand men, while Union forces seemed unable to figure out how to capture Richmond with over a hundred thousand men. Lincoln's unhappiness was further exacerbated by the defeat Union forces suffered in an engagement at Kernstown on July 24 and burning of Chambersburg, Pennsylvania, by Confederate cavalry raiders six days later. Moreover, the fiasco at the Crater (which occurred on the same day as the Chambersburg raid) and inability of operations north of the James in the days prior to it to achieve much either, made it understandably difficult to see much promise in operations at Richmond and Petersburg. Under these circumstances, there was no chance the Lincoln administration would let Grant have the Sixth Corps or Nineteenth Corps at the Richmond-Petersburg front until Early's command had been defeated.

In the months that followed, Grant would show he continued to have faith in operations designed to turn the Confederate fortified defenses south of Petersburg, Due to the reduction of his force, with the Sixth Corps remaining in the Shenandoah Valley until Early's command had been definitively defeated and not returning to Petersburg until December and the Nineteenth Corps afterward being sent to Georgia, Grant seems to have dismissed from his mind pursuing success east of Petersburg by conducting regular siege approaches. Instead, in the months that followed he pinned his hopes for success on a series of operations that probed the Confederate lines north of the James and extended his own south of Petersburg. These enabled the Federals to extend their fortified lines

22 Grant to Halleck, July 15, 16, 1864, OR, vol. 37, pt. 2: 329, 350; Halleck to Auger, July 17, 1864, ibid., 362.

to the Weldon Railroad on August 18-21, across the Squirrel Level Road on September 29-October 2, and briefly establish a foothold on the Boydton Plank Road in late October. In the end, it took until April 1865 for Federal forces to finally secure control of all the railroads south of the Appomattox River, compel the Confederates to extend their lines to the point that they could be successfully assaulted, and render the Confederate position at Petersburg untenable.

Just as compelling as the reduction of his force in Grant's mind as he considered the question of whether to see if regular approaches could bring him possession of Petersburg were political considerations. The general was correct in his presumption that a campaign of regular siege approaches would be a time-consuming endeavor. During the centuries in which European military engineers developed and refined the methods of modern siege warfare in response to the challenge presented by the angled-bastion fortress, it was not unusual for sieges to last several months. The most recent example of large-scale military operations in which siegecraft played a central role, the 1854-55 campaign by the British and French to take Sevastopol, had lasted from October 1854 to September 1855, though a breach in the Russian lines large enough to allow a successful assault was created after only a few weeks. The British and French high commands missed their chance to take advantage of it, though—an error the ever aggressive and opportunistic Grant seems extremely unlikely to have committed.

Still, it was not unreasonable to fear that regular siege approaches would take weeks, if not months, of sustained labor to produce results. Grant keenly appreciated that the Lincoln administration and the northern public did not possess a great deal of patience when it came to military operations or enthusiasm for the methodical nature and tediousness of siege warfare. Moreover, with presidential and congressional elections and three years of war-weariness looming large in the North, the summer of 1864 was, understandably, not a time when the Union high command could presume time to be on their side. When conducted in line with the rules of the craft, siege warfare was a highly formalized and controlled affair in which skilled technicians reduced military operations to a predictable problem of geometry and mathematics. One can be forgiven for presuming this to be a positive thing. It certainly was a major reason siege warfare was appealing to professional military men. Yet, Union commanders served a public and government that wanted and expected military campaigns

to have a certain degree of excitement and drama. They wanted a war defined by sweeping maneuvers and grand assaults in which victory or defeat rested on a particular dramatic moment in which the genius of commanders and the spirit and character of the men in the ranks, not cold mathematics and science, were the decisive factors in determining success or failure.

That this was the case was evident in the intense frustration that developed among many in the North over the generalship of George B. McClellan and hanged over all discussion of military operations in Virginia after the general's removal from command. In line with his training as an engineer, McClellan's military efforts were characterized by what to many northerners was an excessive attention to preparation and technical aspects of war and excessive insistence on professional management of military affairs. These qualities, in the eyes of fellow graduates of West Point and products of the regular army, were decided positives. In the eyes of many—and especially so among influential Republicans—they were not, for they produced military operations that they considered too slow, too risk and casualty averse, too boring, and too methodical. The prime example of this was his decision to resort to siege operations against Yorktown in the spring of 1862. While a time-consuming endeavor that severely tried the patience of President Lincoln and many others in the North, McClellan's methodical emphasis on engineering and artillery at Yorktown placed the Confederates defending the town in an almost impossible situation, as Gen. Joseph Johnston advised Richmond. "We are engaged in a species of warfare at which we can never win," Johnston declared as he impotently watched McClellan's legions emulating the Allied army of 1781's approach to dealing with fortifications defending Yorktown by putting the engineers to work methodically designing and constructing siegeworks of their own for their heavy guns. "It is plain that General McClellan will . . . depend for success upon artillery and engineering," Johnston observed, "We can compete with him in neither. . . . We can have no success while McClellan is allowed . . to choose his mode of warfare."[23]

Less than a week after penning these words, Johnston decided he had no choice but to abandon Yorktown and the entire Lower York-James Peninsula to the Federals. Shortly after taking Johnston's place as commander of the Army

23 Johnston to Lee, April 30, 1862, OR, vol. 11, pt. 3: 477.

of Northern Virginia as it confronted McClellan's army and its methods a short distance from Richmond in June 1862, Lee echoed his predecessor's gloomy estimate of the prospects for success against a Federal army conducting operations along the lines McClellan was. "McClellan will," Lee predicted, "take position from position, under cover of his heavy guns & we can not get at him without storming his works. . . . It will require 100,000 men to resist the regular siege of Richmond, which would only prolong not save it."[24] The two years of war that followed further confirmed Lee's estimate of the situation. "We must destroy this army of Grant's before he gets to James River," Lee told a subordinate in June 1864, "If he gets there, it will become a siege, and then it will be a mere question of time."[25]

Of course, even though it managed to get Union forces less than ten miles from Richmond, the campaign of which the Yorktown siege was a part failed to capture the Confederate capital. Why the campaign failed—and the methods McClellan employed in conducting it—became hotly debated through the lens of partisan politics. Indeed, even before the Confederates drove his army from the gates of Richmond in the Seven Days' Battles, Republicans in Congress and the Lincoln administration had come to despise and distrust McClellan and his methods. Not least among the reasons for this was the fact that his efforts confirmed and exacerbated the intense suspicions of West Point-trained officers that many Republicans held even before the war began. These were in part a response to the thinly veiled elitism contained in the claims of specialized expertise in the conduct of military operations that regular army officers, and engineers in particular, put forward. [26]

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24 Lee to Davis, June 5, 1862, in *The Wartime Papers of Robert E. Lee*, edited by Clifford Dowdey and Louis Manarin (1961; New York: Da Capo, 1987), 184.

25 Jubal A. Early, "The Campaigns of Gen. Robert E. Lee. An Address . . . before Washington and Lee University, January 19th 1872," in Gary W. Gallagher, ed., Lee the Soldier (Lincoln: University of Nebraska Press, 1995), 65.

26 The clash between professional officers and the Republican Party is a central theme in Bruce Tap's outstanding study of the committee in Congress that Republicans organized and leveraged to advance what Tap argues were dangerously simplistic, obsolete, and politicized views on war and make life miserable for generals who did not agree with them. Tap, *Over Lincoln's Shoulder: The Committee on the Conduct of the War* (Lawrence: University Press of Kansas, 1998). In the latest examination of this well-studied subject, Cecily N. Zander insightfully links the views of Republican critics of West Point and the regular army during the war to the role the regular army played before the war and was envisioned to play in westward expan-

It certainly did not help matters that McClellan and his supporters in the army, with some justification, attributed difficulties on the York-James Peninsula to political interference upsetting their carefully crafted plans.

Because Republicans were in charge of both Congress and the administration, the party could not let this charge go unanswered or fail to offer an alternative explanation. McClellan's critics countered the general's complaints about political interference by attributing the slow progress and ultimate failure of the campaign to McClellan and too many of his subordinates possessing a faulty mindset that was too oriented around engineering and not enough around open combat. In their view, products of West Point and the regular army, due to their engineering outlook, overemphasized technical matters such as logistics, lines of operation, and fortifications in the conduct of war. This made them too methodical and cautious in the conduct of operations, and incapable of understanding war was more a matter of moral character than technical skill.

Republicans were aided in their efforts to popularize this critique of McClellan's methods by a press that brought to its analysis of military affairs a mindset, in the words of historian Mark E. Neely Jr. "froze . . . in the heroic language and amateur values of combat . . . not imbued with modern values regarding war." A decidedly different take on McClellan's methods at Yorktown from the one his Confederate counterpart offered was presented in the summer of 1862 by George Wilkes in a series of widely circulated articles that in Neely's words, "helped establish the narrative from which McClellan's military reputation never recovered." Wilkes complained that McClellan's "bloodless strategy" and employment of "the shovel instead of drawing . . . the sword" at Yorktown had denied his army the opportunity to prove their courage and fighting spirit by "taking the meager city by assault."[27]

Republicans eager to take down McClellan and defend their party from the charges he and others leveled at their amateurish view of military affairs and their role in the inability of Union arms to defeat the rebellion eagerly seized on

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sion by slaveholders who dominated the antebellum Democratic Party. Cecily N. Zander, *The Army Under Fire: The Politics of Antimilitarism in the Civil War Era* (Baton Rouge: Louisiana State University Press, 2024), esp. 17-68.

27 Mark E. Neely Jr., *The Union Divided: Party Conflict in the Civil War North* (Cambridge, MA: Harvard University Press, 2002), 69-71.

Wilkes's critique. Indeed, by the fall of 1862, Lincoln himself had come to denigrate the concept of "strategy". Too many people inside and outside the army, he exclaimed in November 1862, "have got the idea into their heads that we are going to get out of this fix, somehow, by strategy! That's the word—*strategy*! General McClellan thinks he is going to whip the rebels by strategy; and the army has got the same notion. They have no idea that the war is to be carried on and put through by hard, tough fighting, that will hurt somebody; and no headway is going to be made while this delusion lasts."[28]

As McClellan entered the realm of partisan politics as a critic of the Lincoln administration and its conduct of the war, the critique of McClellan's generalship had become even more heated by the summer of 1864. Alert to the fact that the Democratic Party was looking to McClellan as a potential political asset and possible presidential candidate, Republicans made a determined effort to discredit his military reputation. McClellan's ability, and those of Democrats, to present their differences with the Lincoln administration and Republicans as rooted in expertise in military affairs, they fully understood, could be a potent political weapon, especially to a country understandably frustrated by the decidedly disappointing results that had been achieved by Union arms in Virginia since Lincoln, with the vast majority of Republicans cheering the move as long overdue, removed McClellan from command in November 1862. It certainly did not help the cause of engineering in July 1864 that an Ohio congressman came away from a visit to Grant's army that month complaining "that he found a good deal of discontent and mutinous spirit among staff officers of the Army of the Potomac. A good deal of McClellanism, he says, was manifested, especially by officers of very high rank."[29]

The dislike for McClellan and desire to discredit him in favor of officers who embraced their view of the rebellion was evident in 1862 by the championing by Republicans both inside and outside the Lincoln administration of generals like John C. Fremont and John Pope who supported hard war measures against the

28 Mary A. Livermore, *My Story of the War: A Woman's Narrative of Four Years Personal Experience As Nurse in the Union Army, and in Relief Work at Home, In Hospitals, Camps, and at the Front, During the War of the Rebellion* (Hartford, CT: A.D. Worthington and Company, 1890), 556-58.

29 Eckert to Rawlins, July 15, 1864, OR, vol. 37, pt. 2: 331.

South, were rivals of McClellan, and rejected the engineering approach to warfare that McClellan exemplified. After McClellan's removal from command in November 1862, it was evident in their embrace of officers like Joseph Hooker who were critical of McClellan and presented themselves as fighting generals who eschewed siegecraft in favor of combat. It was also evident in the hard time they gave to officers in the Army of the Potomac like Meade who shared McClellan's West Point training, engineering background, and tense relationship with the Lincoln administration. Lincoln's secretary John Hay spoke for many when he wrote of Meade in his diary in July 1863, "I doubt him. He is an engineer."[30]

Part of Grant's appeal to Republicans—not to mention many military commentators and historians ever since—was his image as a general who brought a different approach to war. This approach, which it was expected would be evident in his conduct of operations in Virginia in 1864, would be more in line with their views. It would validate their belief that a fundamental problem with the Army of the Potomac was that the West Point engineers who led it were too impressed with the value of logistics and fortifications, did not appreciate the value of hard fighting, and consequently were too cautious to conduct operations with the sort of aggressive spirt that no one could deny Grant possessed.[31]

Grant, of course, fully understood the need to, and immensely skillful at gratifying the needs of his political masters when planning military operations. He certainly understood the political context within which operations at Petersburg took place in the summer and fall of 1864 and that the presidential contest between Abraham Lincoln and George McClellan was to a certain extent a referendum on the latter's conduct of military operations. He could not have been blind to the fact that a victory of trenches, engineering, and siegecraft at Peters-

30 Entry for July 13, 1863, in *Inside Lincoln's White House: The Complete Civil War Diary of John Hay*, edited by Michael Burlingame and John R. Turner Ettlinger (Carbondale: Southern Illinois University Press, 1997), 62.

31 As Brooks D. Simpson observes, Grant was keenly aware of the unrealistic expectations that the North had for a quick and decisive victory at the beginning of the campaign, that military realities made it unlikely they were to be fulfilled, and consequently was not surprised that the result was discontent with his generalship that subsequently sowed the seeds for the "butcher" myth that the South promoted of Grant after the war. Brooks D. Simpson, "Great Expectations: Great Expectations: Ulysses S. Grant, the Northern Press, and the Opening of the Wilderness Campaign' in *The Wilderness Campaign*, edited by Gary W. Gallagher (Chapel Hill: University of North Carolina Press, 1997), 1-33.

Fort Haskell (Library of Congress)

burg would have been seized upon by McClellan's supporters and Lincoln's critics as a vindication of the general and his approach to war at a time when Republicans were attacking both.

Yet, like gratifying Lincoln's need to keep Ben Butler, Nathaniel Banks, and Franz Sigel happy enough not to cause trouble for politically in an election year by giving them important commands, it is possible that the decision to eschew regular siege approaches may have been a case in Grant letting electoral politics shape the management of military affairs in a way that proved "penny wise, pound foolish". What, after all, could have provided a better shot in the arm to Grant's efforts in Virginia—and Lincoln's political prospects in the late

summer and early fall of 1864—than accepting temporary public dissatisfaction using methods that rendered the Confederate defenses of Petersburg untenable, however dull, undramatic, and distasteful the methods for achieving the goal had been?

In addition, as evidenced by the orders he issued on undertaking them, Grant was clearly optimistic about the prospects of his efforts at maneuver achieving decisive results in 1864. And, to be fair, that achieving success Petersburg through maneuver against the transportation network that sustained the town and the army defending it would require a series of operations over several months could only be truly learned through experience. Finally, of course, there was the fact that Grant shared both Lincoln's and the Northern public's impatience and its preference for dynamic campaigns of maneuver and battle. This had been evident throughout his time in command. It was especially evident the last time he had confronted an enemy occupying an extensive system of fortifications at Vicksburg. While it may be harsh from a humanitarian perspective to put it this way, given a choice between wasting lives or wasting time, it is hard to look at the record and not see as one of the characteristics of Grant's generalship a cold willingness to do the former in order to avoid the latter. Given the political context within which he had to work, with an impatient president whose ability to sustain Grant's efforts hinged on his ability to placate an impatient Congress and general public (something that was especially a source of concern in 1864), it is equally hard to gainsay the harsh reality that the North needed a man with such a mindset at the head of its military machine.

Obviously, a good deal of the analysis contained above is based on conjecture and counterfactual analysis that more detailed examination of the matter may find to be impracticable. (Ideas that sound good on paper—the popular military parlance is "it briefs well"—often have a way of translating poorly to the real world.) If nothing else, by raising the question of the suitability of the eschewed option of regular siege approaches, it is hoped this essay might further stimulate and contribute to the overdue sort of questioning and critical thinking about Petersburg that historians have long dedicated to other major campaigns of the Civil War.

The Siege of Port Arthur (1904–5) and Its Lessons for Strategy and Fortifications

by Rotem Kowner

Few sieges in modern history attracted as much global attention as that of Port Arthur. When the fortress capitulated on 2 January 1905, the news reverberated worldwide. For many observers, the Japanese victory carried profound symbolic meaning. Some celebrated it as the first modern triumph of an Asian power over a European empire, while others viewed it with alarm as a harbinger of the so-called "Yellow Peril." Still others, among them Vladimir Lenin, interpreted the event as a sign of the impending collapse of the Russian Empire and its ancien régime.[1] In this respect, Lenin proved prescient. Although the final downfall of tsarism occurred only twelve years later, the surrender of Port Arthur was followed, a mere three weeks later, by the massacre in St. Petersburg known as Bloody Sunday, which ignited the Revolution of 1905. Revolutionary unrest then spread across the empire and became the single most important factor preventing Russia from sustaining its war effort. Militarily, too, the fall of Port Arthur was decisive. Thereafter, Japanese forces advanced deep into Manchuria, won successive engagements, and ultimately eliminated the geostrategic threat Russia had posed on the eve of the war.

The siege of Port Arthur defied conventional definitions, as it combined a sustained naval blockade of the harbor with a protracted land siege of the fortress. Although the land operations themselves lasted a relatively brief 155 days, the entire struggle for this key position extended over almost eleven months and ultimately shaped the outcome of the entire war. This chapter traces the origins of the fort and examine the full course of the 1904 campaign, from the initial Japanese naval attack that opened hostilities, through the successive engage-

1 Vladimir I. Lenin, "The Fall of Port Arthur." In *Lenin Collected Works 8*, 47–55, trans. Bernard Isaacs and Isidor Lasker. Moscow: Foreign Languages Publishing House, 1962.

ments around the fortress and the land siege, to Port Arthur's final capitulation. Beyond narrating these dramatic events, the chapter also evaluates the strategic and tactical lessons contemporaries drew from the campaign and considers the extent to which these insights continue to hold relevance for modern warfare.

The Rise of Port Arthur

Port Arthur's history as a military fort and naval base was relatively brief. Its potential as a naval shelter was first noted during the Second Opium War when, in August 1860, the British gunvessel HMS *Algerine*, commanded by Lieutenant William Arthur, entered the natural bay at the southern tip of the Liaodong Peninsula near the village of Lüshun. Western visitors subsequently named the harbor "Port Arthur." Located at the highly strategic junction where the Yellow Sea meets the Bohai Sea, effectively acting as a "lock" on the maritime approaches to Beijing and Tianjin, its strategic value, however, was not fully recognized until two decades later. In 1880, Captain Constantin von Hanneken, a German adviser to the Qing government, argued that the harbor's narrow entrance and surrounding hills could render it nearly impregnable if properly fortified. On his recommendation, the site was selected as the principal base of the newly established Beiyang Fleet under Li Hongzhang. From 1882 onward, docks and shipyards were constructed, the harbor was dredged, and the position developed into a major land and naval fortress, with the German firm Krupp later completing the permanent fortification.[2]

In 1891 Russia began constructing the Trans-Siberian Railroad, intended to link European Russia with the Pacific and enable rapid deployment of its vast army across Eurasia. The project alarmed Japan, which was pursuing expansion on the Korean Peninsula. Japanese leaders believed they had only a limited window to secure their position in Korea before the railway shifted the regional balance of power. The First Sino-Japanese War of 1894–1895 grew directly from this urgency. Although fought primarily over Korea, Japanese forces soon advanced into Manchuria. Within months they crossed the Yalu River and

2 Joseph H. Longford, "A History of Port Arthur." The Nineteenth Century and After: A Monthly Review 55, Iss. 326 (Apr 1904): 618–29; Hyman Kublin, "A Century of Port Arthur," *U.S. Naval Institute Proceedings* 83, no. 5 (1957), pp. 504–14; James Allen, *Under the Dragon Flag: My Experiences in the Chino-Japanese War* (New York: Frederick A. Stokes, 1898(, p. 39.

captured Port Arthur after a single day of fighting. In the aftermath, Japanese troops massacred Chinese prisoners and civilians, though the number of victims remains debated.[3] At war's end, Japan secured Port Arthur under the Treaty of Shimonoseki, but Russia, backed by France and Germany, soon compelled Japan to withdraw in the so-called Triple Intervention.[4]

Japan's relinquishment of Port Arthur did not ensure its continued security under Chinese control. In March 1895, Tsar Nicholas II and Foreign Minister Aleksei Lobanov-Rostovskii resolved to link the Trans-Siberian Railway to an ice-free port beyond Vladivostok, making this a cornerstone of Russian policy in Northeast Asia. The 1896 Li–Lobanov Agreement secured China's consent for construction of the Chinese Eastern Railway across Manchuria. In December 1897, Russian warships entered Port Arthur, initiating occupation. On 27 March 1898, under pressure, the Qing government signed the Russo-Chinese Convention, granting Russia a renewable twenty-five-year lease over Port Arthur and Dalny. Russia then began building the South Manchuria Railway to connect these ports with the Chinese Eastern line and restricted foreign vessels to Dalny, reserving Port Arthur primarily for naval use. Thereafter, the Russians expanded Port Arthur's berthing facilities, yet they had insufficient time to modernize the shipyard or strengthen the fortifications adequately. As a result, the port's only dry dock was incapable of accommodating the newly arrived battleships.

Russian engineers were also unable to widen the narrow harbor entrance, which permitted the passage of only a single large vessel at a time, and then only at high tide with the assistance of tugs. Although the Tsar approved plans to cut a second channel through the protective peninsula, these were not implemented before the outbreak of war. Work on the fortress defenses began in 1899, concentrating on building six permanent fortifications as a protection against land attack, with completion projected within a decade.[5] As part of the coastal defense system, twenty-one batteries equipped with various calibers were in-

3 See Great Britain, War Office, General Staff, O*fficial History of the Russo–Japanese War, Part III: the Siege of Port Arthur* (London: Harrison and Sons, 1909), pp. 8–9; S.C.M. Paine, *The Sino-Japanese War of 1894–1895: Perceptions, Power, and Primacy* (Cambridge: Cambridge University Press, 2003), pp. 207–23.

4 See Paine, *Op. cit*., pp. 247–94.

5 Great Britain, War Office, General Staff. *Official History (Naval and Military) of the Russo–Japanese War*, 3 vols. (London: Harrison and Sons, 1910), pp. 319–20.

stalled, some of them in permanent concrete structure. In 1901, reconstruction of the fortress itself commenced, yet by 1904 only one of the original Chinese forts had been fully modernized. The principal defensive line traced the outer arc of the semicircular hills surrounding the harbor, designed to provide mutually supporting fields of fire. Its total length, from sea to sea, measured approximately nineteen kilometers. The most vulnerable sector lay along a 4,500-meter stretch northwest of the harbor and New Town. Dominating both areas was 203 Meter Hill, heavily fortified with trenches and redoubts along its flanks.[6]

Port Arthur on the Eve of the Russo–Japanese War

On the eve of the Russo-Japanese War, the fortress of Port Arthur, now under Russian control, became one of the first major strongholds to confront the full force of industrial-age warfare. Although redesigned at the turn of the century, its permanent defenses still reflected the detached-fort system of the 1870s and remained incomplete. The initial garrison comprised approximately 18,000 soldiers, a similar number of sailors, and more than 20,000 civilians, most of them Chinese. Armament was likewise inadequate. Of the 552 field guns planned for the fortress, only 116 had been installed, and all but eight were oriented toward the sea rather than the landward approaches. As the war progressed, both troop strength and readiness improved. By late May 1904, roughly three and a half months after the outbreak of hostilities, around 47,000 troops, organized into 32 battalions, defended the fortress, supported by approximately 300 guns.[7]

In the three months that followed, Russian forces worked intensively to strengthen the defenses and close the wide intervals between the various fortifications, employing both soldiers and thousands of contracted Chinese laborers. The resulting system consisted of two principal defensive lines intended to prevent a besieging force from bombarding the harbor from land. These works included six major forts at varying levels of readiness, several redoubts and lunettes, numerous batteries, several kilometers of trenches, and other field defenses (see Map 1). Even so, the fortress did not form a compact Vauban-style

6 See Great Britain, O*fficial History*, pp. 25–6.

7 William Apsley Smith, "Port Arthur: Epitome of Operations of the Third Japanese Army from the Battle of Nan Shan on 26th May 1904 to the End of the Siege." In Great Britain, *The Russo-Japanese War*, 2:362.

Map 1. The Russian defensive lines around Port Arthur by the end of July 1904: Long Hill (1), 203 Meter Hill (2), the Waterworks Redoubt (3), Source: Hermann von Müller, *Geschichte des Festungskrieges von 1885 bis 1905 einschließlich der Belagerung von Port Arthur* (Berlin: Ernst Siegfried Mittler und Sohn, 1907).Fort Sungshu (4), Fort Erhlung (5), the two Panlung forts (6), and Fort Chikuan (7). The six principal forts are marked with an asterisk (*).

ring; it remained partly improvised, shaped by the surrounding terrain, and uneven in strength. The outer defensive ring followed a chain of low hills that were heavily fortified. About 1.5 kilometers behind this line stood a strong wall enclosing the old town of Lüshun. Russian engineers further extended this inner line westward so that it also incorporated the new town of Port Arthur.[8]

8 See Great Britain, O*fficial History*, pp. 26–34.

Equally important to the defense was the Port Arthur Squadron, Russia's naval force stationed in the harbor. It consisted of seven battleships, several cruisers, two destroyer flotillas with 25 vessels, along with gunboats and auxiliary vessels. Yet the squadron suffered from serious disadvantages: Japan possessed more cruisers, better-trained crews, and generally more modern ships, while Port Arthur's repair facilities were inadequate for handling major damage to large vessels. The base itself was also geographically isolated. Vladivostok, Russia's other Pacific base, lay roughly 2,000 to 2,400 kilometers away by sea and was vulnerable to winter ice. For these reasons, although the Port Arthur Squadron represented a formidable local force and posed a serious obstacle to Japanese operations, it could not match the Imperial Japanese Navy in overall capability or operational flexibility.

Japanese planners viewed Port Arthur as a pivotal objective in the months leading up to the war. Their strategy reflected geopolitical realities shaped by Japan's position as an island state and an emerging imperial power. Securing a foothold on the Asian continent, above all in Korea, was essential to its imperial ambitions. Equally vital was control of the surrounding seas, since Japan could not sustain continental operations without maritime superiority, which in turn required neutralizing Russia's Pacific Squadron at Port Arthur. Conscious of its relative inferiority in manpower and economic resources, Japan aimed for a short, limited war that would be concluded before Russia could fully mobilize and dispatch large reinforcements across Eurasia. Diplomatic isolation of Russia and careful timing were therefore integral components of Japanese strategy. Accordingly, Japanese war planning focused first on crippling, and if possible destroying, the Russian fleet at Port Arthur, and then on seizing the port itself, together with the strategically vital Kwantung Peninsula and the broader Liaodong region on which it stood.[9]

The centrality of Port Arthur within Japan's geostrategic calculations was evident from the outset. Although Manchuria did not feature in Japan's for-

9 See S.C.M. Paine, *The Japanese Empire: Grand Strategy from the Meiji Restoration to the Pacific* (Cambridge: Cambridge University Press, 2017), 54–7; Rotem Kowner, "The Russo-Japanese War." In *The Cambridge History of Strategy, 2 vols., Vol. II: From the Napoleonic Wars to the Present*, edited by Isabelle Duyvesteyn and Beatrice Heuser, 122–41 (Cambridge: Cambridge University Press, 2025), pp. 129–35.

mal prewar demands, Japanese planners fully anticipated that war with Russia would require the seizure of southern Manchuria, above all the naval base at Port Arthur. Control of this region was to enable Japan to eliminate the Russian military presence in southern Manchuria and to retain territory as leverage in eventual peace negotiations. Equally important, the destruction of the Russian fleet based at Port Arthur would confer the naval supremacy essential for sustaining Japan's war effort and securing victory. It is therefore no surprise that, from the very opening of hostilities, Port Arthur became the prime target for Japan's war efforts, and during the first 11 months of 17-month conflict, it was the main site of warfare. Victory in this struggle had not only strategic but also moral implications. As Russia's principal naval base and strongest fortress in East Asia, Port Arthur was a potent token of tsarist imperial power in the region.

The siege of Port Arthur was conceived as a joint operation, uniting a naval blockade with a subsequent land encirclement in order to isolate the fortress completely. This plan was not unprecedented, yet it arose only under particular strategic circumstances. Such complex operations usually occurred when three conditions converged: the besieged city stood on the coast, the attacking power possessed both an effective army and navy in the theater, and isolating the city from external support was essential to compel surrender. In the broader history of warfare, many sieges of coastal cities depended on naval blockades. A city with access to the sea could often continue receiving supplies, reinforcements, and sometimes evacuations. Without severing maritime access, a land siege alone rarely succeeded. Port Arthur fit this pattern precisely. The combination of land encirclement and naval blockade was therefore not only logical, but indispensable. Port Arthur met all three conditions. To understand the campaign more clearly, it is useful to divide the siege into three phases, each of which will be discussed below.

Phase I: The Naval Blockade

The nineteen-month Russo–Japanese War began on the night of 8 February 1904, when Japanese naval forces launched a surprise attack on the Russian naval base at Port Arthur. The objective was to cripple the main units of Russia's Pacific Fleet in the opening hours of the conflict. To this end, the Combined

Fleet under Admiral Tōgō Heihachirō departed Sasebo on 6 February and sailed toward Russia's principal naval base in East Asia. On the evening of 8 February, at 19:00, Tōgō detached five flotillas of destroyers. Three flotillas were assigned to attack Port Arthur, while two headed toward Dalny. At 22:50, the ten destroyers bound for Port Arthur unexpectedly encountered Russian warships. Although the Russians neither opened fire nor reported the contact, the encounter compromised the element of surprise.[10]

Shortly before midnight, as the Japanese destroyers approached the harbor entrance, they received the signal to attack and accelerated to full speed. Each vessel launched torpedoes, striking first the protected cruiser *Pallada* and then the battleship *Retvizan*. In the early hours of the morning, several destroyers returned for a second attempt, during which the battleship *Tsesarevich* was also hit. In total, the ten Japanese destroyers fired sixteen torpedoes, achieving three hits against an unprepared fleet at anchor. The operation revealed both tactical lessons and shortcomings. The Imperial Japanese Navy subsequently encouraged more dispersed, individual attacks rather than tightly massed night assaults, which carried a high risk of collision. It also became evident that Japanese planners had overestimated the effectiveness of torpedoes, as many torpedoes were launched from excessive ranges.[11]

The three damaged Russian warships were quickly run aground in shallow water and were able to return to active service before long. Although the Russian forces in the harbor had been taken completely by surprise, the initial night attack produced no decisive results. On the following day, 9 February, the Japanese main force opened fire on the harbor, employing the battleships' 305-millimeter (12-inch) main guns. In an effort to challenge the attackers, the cruiser *Novik* steamed out but was struck by several shells. The battleship Poltava and two additional cruisers were also hit within the harbor. Russian gunfire, however, scored hits on Japanese warships, prompting Tōgō to break off the engagement. The Japanese force then withdrew toward Sasebo, its nearest home base, after first reuniting with the task force that had just completed operations in Korea, securing victory at the Battle of Chemulpo.

10 See Julian S. Corbett, *Maritime Operations in the Russo–Japanese War, 1904–1905* (Annapolis, MD: Naval Institute Press, 1994), 88–94.

11 Corbett, *Maritime Operations*, pp. 94–100.

Failing to inflict decisive damage on the Russian warships, the Imperial Japanese Navy next sought to neutralize Port Arthur by permanently blocking its harbor entrance. Plans to seal the port had been formulated as early as October 1903, four months before the outbreak of war. The chief architect of this scheme was Commander Arima Ryōkitsu, who possessed first-hand knowledge of the site and understood that Port Arthur was accessible through a single narrow and shallow channel. By December 1903, Arima had prepared five blockships at Sasebo specifically for this purpose. On the eve of hostilities, however, Admiral Tōgō Heihachirō, commander-in-chief of the Combined Fleet, opposed the plan. He doubted that the Russians were seeking a decisive naval engagement and preferred instead to contain the Pacific Fleet at a distance rather than provoke it through risky close-range operations.

Nonetheless, the failure of the initial destroyer attack on Port Arthur, together with equally ineffective efforts to bombard the harbor from the sea, eventually prompted Tōgō and his staff to revisit Arima's proposal. Approximately two thousand sailors volunteered for the perilous undertaking, of whom sixty-seven were selected for the first operation. The first blockship attempt took place on the night of 24 February 1904. It relied on several obsolete transport vessels, heavily ballasted with cement and stone and equipped with scuttling charges. As they neared the harbor entrance, the ships were detected and subjected to intense fire from Russian coastal batteries and warships, including *Retvizan*. All were sunk before they could meaningfully impede the channel. Most of the crews were rescued by Japanese torpedo boats, and overall casualties remained comparatively light.[12]

In the wake of these setbacks, Admiral Tōgō turned to long-range bombardment of the port. On the night of 10 March several Japanese warships opened fire from a distance, but the roughly 150 shells inflicted only limited damage, encouraging the Russians to believe they had successfully deterred their opponent. A further long-range bombardment on the night of 23 March proved no more effective, suggesting that this method was largely ineffectual.[13] Under these circumstances, the Japanese reverted to the use of blockships. Five weeks

12 Corbett, *Maritime Operations*, pp. 129–35.

13 Great Britain, O*fficial Histor*y, pp. 10–11; Corbett, *Maritime Operations*, pp. 151–2, 163

after the first blockade attempt, a second blocking operation was launched on the night of 26–27 March, again based on Arima's plan and employing four larger merchant vessels. As before, the ships were detected several kilometers from the harbor entrance; nevertheless, the commander of one vessel, Lieutenant Commander Hirose Takeo, managed to bring his ship, Fukui Maru, close to the channel before it was sunk. Hirose was killed in the action, and his death, celebrated in Japan as an act of heroic self-sacrifice, electrified both the Imperial Japanese Navy and the wider public. Meanwhile, morale among the Russian naval forces at Port Arthur improved with the arrival of Vice Admiral Stepan Makarov as the new commander of the Pacific Squadron, who immediately set about intensive training and raising operational readiness.[14]

The defenders' newly heightened state of readiness was soon put to the test. On 13 April 1904 the Russian destroyer *Strashnyi*, returning from patrol, was intercepted by Japanese destroyers near Port Arthur, triggering a brief engagement. Observing the clash, Vice Admiral Makarov first dispatched the cruiser Bayan to assist and then personally led a larger force of battleships, cruisers, and destroyers into the Yellow Sea in search of the Japanese fleet. In the haste of operations, mine precautions at the harbor approaches proved insufficient. When the morning fog lifted and the Russians realized that Tōgō's main force was nearby, they turned back toward Port Arthur. As the battleship *Petropavlovsk* neared the entrance, it struck a Japanese mine, suffered catastrophic secondary explosions, and sank within minutes, killing Makarov and most of the crew.[15] Five weeks later the Japanese suffered a severe reverse when the battleships *Hatsuse* and *Yashima* were sunk by Russian mines, a loss that removed two of Japan's six modern battleships from the order of battle. [16]

Undeterred, Admiral Tōgō pressed for a third blocking operation. Despite reservations within the naval staff, eight blockships—generally larger and faster than those previously used—were assembled. The final attempt took place on the night of 2–3 May 1904 under the operational command of Commander Hayashi Mineo. Confronted by intensified Russian defenses and searchlights, the

14 Corbett, *Maritime Operations*, pp. 164–5.

15 Corbett, *Maritime Operations*, pp. 179–83.

16 Corbett, *Maritime Operations*, pp. 180–4; Evgenii K. Nojine, *The Truth about Port Arthur* (London: John Murray 1908), pp. 32–5.

ships were detected early and sank under heavy fire, failing to seal the harbor entrance. Casualties among the roughly 150–160 volunteers were severe, with several dozen killed, including Hayashi himself. In total, the Imperial Japanese Navy expended seventeen blockships and lost many volunteers in these ultimately unsuccessful efforts to close Port Arthur's channel.

Despite his losses, Tōgō publicly declared the final blockade mission a success, thereby reinforcing the impression of Japanese naval control and helping clear the way for the landing of the Second Army at nearby Pitzewo (today's Pikou) two days later.[17] Tōgō had strong reasons to press on. He was acutely aware of reports that Russia's Baltic Fleet was preparing to sail for East Asia and might unite with the Pacific Squadron, a development that could erode Japan's naval superiority, especially in light of the Imperial Navy's losses in May 1904. At the same time, Field Marshal Ōyama Iwao, commander-in-chief of Japanese forces in Manchuria, urgently required reinforcements and hoped that the capture of Port Arthur would free the Third Army to join his main forces. Beyond these strategic considerations, the fall of Port Arthur also carried immense psychological and symbolic weight, bolstering military morale and public confidence alike.

Tōgō and his fleet were fortunate in one respect: despite the Russian Port Arthur Squadron holding a six-to-four numerical advantage in battleships, the Russian command became increasingly demoralized following the death of Admiral Makarov. The squadron ceased major offensive operations, effectively devolving into a passive "fleet in being." However, as the Japanese siege lines tightened and pressure from Viceroy Evgenii Alekseev mounted, the naval command was finally compelled to attempt a breakout to Vladivostok. Reluctantly, Rear Admiral Wilgelm Vitgeft agreed to lead the effort. On June 23, 1904, he made his first sortie with six battleships and a screening force of cruisers and destroyers. However, upon encountering the Japanese main battle line, Vitgeft lost his nerve and retreated to the safety of the harbor.[18]

It was not until dawn on August 10 that he made a second, more determined attempt. The Japanese Combined Fleet, which had been maintaining a vigilant

17 Corbett, *Maritime Operations*, pp. 213–17.

18 Corbett, *Maritime Operations*, pp. 292–309.

blockade for weeks, immediately gave chase. In the resulting Battle of the Yellow Sea, the Russian flagship *Tsesarevich* suffered a catastrophic hit to its conning tower. The blast killed Vitgeft instantly and jammed the ship's steering, causing the flagship to veer wildly out of formation. This sparked panic and confusion; while some vessels fled to neutral ports, the majority of the squadron retreated ignominiously to Port Arthur. Thereafter, the squadron ceased to function as a cohesive naval unit. Its guns were stripped for land defenses and its sailors were reassigned as infantry, leaving the fate of the fleet—and the fortress—entirely in the hands of the Imperial Japanese Army.[19]

Phase II: The Initial Land Siege

The land siege effectively began once the Imperial Japanese Army secured control of the Liaodong Peninsula. On 26 May 1904, the Second Army cut Port Arthur off from the mainland with the capture of Nanshan, a hill situated in a narrow passage dividing the southern half of the Liaodong Peninsula from the northern part of the Kwantung Peninsula.[20] Earlier that month, the Japanese high command had created a new formation, the Third Army, specifically tasked with taking Port Arthur, and appointed Lieutenant General Nogi Maresuke, soon promoted to full general, as its commander.[21] From that point forward, the 55-year-old Nogi would play the central role in the fortress's eventual fall. By then he had already built a distinguished career: he had served as a regimental commander during the Satsuma Rebellion of 1877, studied military science in Germany in the late 1880s, commanded a division in the First Sino–Japanese War, and briefly held the post of Governor-General of Taiwan between 1896 and 1898. His final assignment before retiring in 1901 was command of the Eleventh Division, one of the army's principal formations.[22]

With the outbreak of the Russo–Japanese War, Nogi returned to active duty,

19 Great Britain, O*fficial Histor*y, p. 41; Great Britain, *Official History (Naval and Military)*, pp. 333–53; Corbett, *Maritime Operations*, pp. 370–413; Nojine, *The Truth*, pp. 150–4.

20 Great Britain, O*fficial Histor*y, pp. 12; United States, War Department, Office of the Chief of Staff, *Epitome of the Russo-Japanese War* (Washington: Government Printing Office, 1907), p. 15.

21 Tani, *Kimitsu Nichiro senshi*, p. 168.

22 See Hata Ikuhiko, *Nihon riku-kaigun sōgō jiten*, 110; Kowner, *Historical Dictionary of the Russo–Japanese War*, pp. 377–9.

initially commanding the First Depot Division in Tokyo before assuming leadership of the newly created Third Army. His appointment drew heavily on his experience at Port Arthur a decade earlier, although expectations of a swift and easy success underestimated the challenge ahead. After spending roughly a month preparing a base, the Third Army, initially composed of the First and Eleventh Divisions, gradually detached itself from the Second Army and deployed to the north of Port Arthur. At this stage, Nogi commanded approximately 80,000 troops organized into sixty-three battalions, three cavalry squadrons, seventeen engineer companies, and supported by 474 field guns. Opposing him was the commanding officer of the fortress, Lieutenant General Anatolii Stessel. Born into a military family of Baltic German origin, the 56-year-old Stessel was trained in artillery and spent much of his career in administrative and staff roles, with prior service in Central Asia and the Russo-Turkish War, but with limited experience commanding large formations in active combat. Personally courteous and self-assured, he was nevertheless regarded by critics as indecisive and overly cautious, traits that later fueled controversy over his decision to surrender the fortress.[23]

Stessel had at his disposal some 42,000 men in two full divisions (the 4th and 7th Siberian Rifle Divisions and one regiment of the 2nd Siberian Rifle Division), consisting of nine infantry regiments as well as a reserve. They were supported now by 646 guns and 62 machine guns. Military observers did not seem to appreciate Stessel. German naval observer Albert Hopmann wrote of him "He is described as a boastful sergeant, who possesses neither the personal attributes nor the professional expertise to fulfill his duty. He is undoubtedly poorly educated, speaks no language other than Russian, knows nothing outside of Russia and Russian circumstances …"[24] More general, the Russian officers, Hopmann found, were "too much front-line fighters, following ponderous, obsolete forms and traditions, exhausting themselves in minutiae and thereby losing sight of the large picture."[25]

During 3-4 July 1904, the Russians checked Nogi's initial attack by a res-

23 Kowner, *Historical Dictionary of the Russo–Japanese War*, pp. 511–13.

24 Oliver Griffin, "Perceptions of Russia in German Military Leadership during the War." In *Rethinking the Russo-Japanese War, 1904–05: Centennial Perspectives*. Edited by Rotem Kowner (Folkestone, UK: Global Oriental, 2007), p. 355.

25 Griffin, Op. cit., p. 355.

olute though unsuccessful counter-stroke, and they repeated their doughty defense in the face of another Japanese attack on the fortified Green Hills line on 26 July (see Map 2). Despite assistance from the warships' guns in the harbors, the Japanese succeeded in breaking through on the night of 27–28 July.[26] During the next two days, they forced the defenders to withdraw to an inner line, which had been reinforced in the previous months. The five days of fighting cost the Third Army more than 4,000 casualties, which forced Nogi to look for a less costly approach. Hence on 7 August he started shelling the city and its defense line from land and sea. The bombardment went on for 13 days, while the Japanese infantry encroached along the front and gained ground where it could.[27]

The first general assault began the night of 19 August and lasted six days. The Japanese 9th Division together with the seasoned 11th Division began a frontal assault on the center of the northeastern front and the two forts of East and West Panlung in particular, defended by troops under the command of Major General Vladimir Gorbatovskii.[28] Despite some initial gains, the Japanese forward movement was checked gradually by incessant Russian artillery, under the command of Major General Vasilii Belyii, as well as deteriorating weather conditions, but, ultimately, they took over the two forts. At the same time, Nogi's attempts to capture Wantai (Eng. Eagle's Nest) not only failed but cost him many casualties. These six days of heavy fighting ending on August 25 resulted in 14,000 casualties for Japanese army, including 2,300 dead and numerous missing in actions.[29] By now the Third Army had lost 18,000 men, out of total troop strength of 56,000, with gains of two forts dominated by the unconquered Wantai. [30]

The unyielding siege provided abundant opportunity for violation of the Geneva Convention, to which both parties were committed. During the fierce attacks against Wantai, thousands of soldiers, most of them Japanese, were left

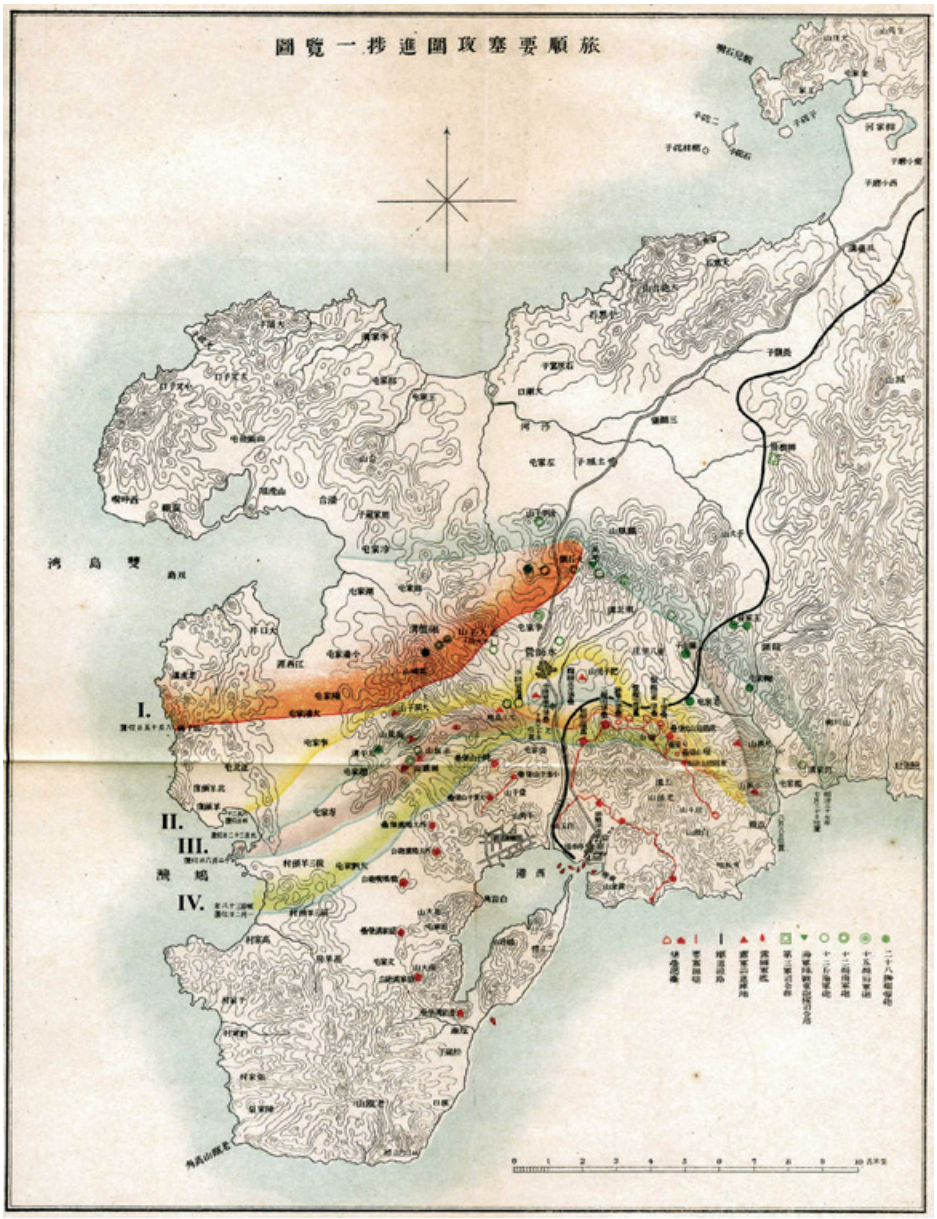
26 Great Britain, O*fficial Histor*y, pp. 15–23; Charles A.L. Yate, "Port Arthur: Operations in the Kuan-tung Peninsula from 26th May to 31st July 1904." In Great Britain, *The Russo-Japanese War*, 2:353–9.

27 Great Britain, O*fficial Histor*y, pp. 38–41.

28 Charles A.L. Yate, "Port Arthur: Operations of the 9th Japanese Division, the 19th to the 31st August 1904." In Great Britain, *The Russo-Japanese War*, 2:421–5.

29 Smith, "Port Arthur," 2:363.

30 Ōe Shinobu, *Nichiro sensō no gunji shiteki kenkyū* (Tokyo: Iwanami Shoten, 1976), p. 134.



Map 2. Stages in the Japanese encirclement of the Port Arthur defenses: I, 15 August 1904; II, 24 August 1904; III, 8 December 1904; IV, 2 January 1905 (capitulation of the fortress). Source: Japan, Imperial Japanese Navy General Staff. *Meiji Sanjūshi-chi-hachinen Kaisen-shi*, (Tokyo: Suikosha, 1909), vol. 2.

wounded and dead between the lines of the two sides. The Japanese were agitated about the fate of their soldiers lying on the battlefield, since it was impossible to get them out. Yet the proximity of the belligerents, and the desire of each to keep its dispositions as secret as possible, rendered futile any discussion of a temporary armistice. While the Russians did not allow the Japanese to enter the area, they attempted to gather their own wounded. The Japanese were furious at what they considered a breach of military decorum and opened fire on some of the Russian burial parties, forcing them to withdraw. Under these circumstances, about 7,000 dead and wounded Japanese and an unknown number of Russians were left exposed between the lines. Eventually many were rescued, but hundreds lying higher up the mountain, closer to the Russian lines, were left to die slowly. Bolstered by the Japanese casualties during August, Stessel delivered a counter-attack against the two forts on the night of 27–28 August but failed to recapture them.[31]

In light of the heavy losses and under mounting pressure from Ōyama, Nogi was compelled to adopt a new tactic. Contemporary military observers were quick to note that the late August assault marked "the termination of what may be described as the first phase of the siege of Port Arthur."[32] Instead, Nogi adopted a strategy of gradual advance, relying on elaborate sapping operations and the deployment of heavy artillery. Thereafter, the highest ground overlooking Port Arthur, most notably 203 Meter Hill and the adjacent 210 Meter Hill, became the scene of some of the fiercest fighting of the Russo-Japanese War. Separated by little more than one hundred meters and linked by a narrow, exposed ridge, these elevations dominated the approaches to the inner harbor. From their summits, observers could command a clear view of the anchorage as well as several of the fortress's principal defensive works, rendering control of the ridge strategically indispensable. Prior to the outbreak of hostilities, the position had lacked permanent fortifications, largely for financial and planning reasons. Once war became imminent, however, Russian commanders hurriedly strengthened the heights with field defenses constructed from timber, steel rails, and packed earth, reinforced by trenches, barbed wire entanglements, and interlocking fields of fire. During the early months of the siege, these improvised defenses proved

31 Great Britain, O*fficial Histor*y, pp. 51–3.

32 Smith, "Port Arthur," 2:363.

largely impervious to Japanese field artillery. Their vulnerability became apparent only in early autumn, with the arrival of eighteen heavy, British designed and Japanese made 280-millimeter howitzers dispatched from Japan, after an earlier consignment had been lost on 15 June 1904 when its transport, the *Hitachi Maru*, was sunk in the Tsushima Strait.

On 19 September 1904 Nogi launched a second general assault. He initially focused on 203 Meter Hill and the Waterworks Redoubt to the east, only later recognizing the decisive strategic importance of the former position, which led him to resolve to capture it at almost any cost. The Redoubt, as British observers noted, "furnished a remarkable example of the effectiveness of good provisional defences in the hands of determined garrison."[33] However, after nearly three weeks of preparation, with minimal Russian interference, the Japanese 9th Division stormed the Waterworks Redoubt at dawn and again during the night, while the 1st Division engaged the Temple Redoubt, Long Hill, and 203 Meter Hill. Sustaining heavy losses, the defenders of Long Hill eventually retreated, and after four days of fighting the Waterworks and Temple Redoubts also fell into Japanese hands. Yet 203 Meter Hill remained unconquered, though increasingly exposed to fire on its northern flank.[34]

To reach the first Russian trench, the attackers had to cross nearly half a kilometer of open ground under heavy fire. After two days of assaults and some 2,300 casualties, the Japanese abandoned the attempt. A further turning point came on 1 October, when the heavy 280-millimeter howitzers were finally brought into action. By 10 October, they had commenced a systematic bombardment, firing shells weighing 217 kilogram each (see Figure 1).[35] Throughout October, sapping operations continued relentlessly as all three Japanese divisions pressed their assaults, culminating in the third general assault on 26 October. The 1st Division targeted Fort Sungshu, the 9th Division Fort Erhlung, and the 11th Division Fort Chikuan. Although Nogi failed to capture the fortress in time for Em-

33 Great Britain, O*fficial History*, pp. 56.

34 Claude M. Crawford, "Port Arthur: Diary of the Officers attached to the Third Japanese Army from 29th July 1904 to the Fall of the Fortress." In Great Britain, *The Russo-Japanese War*, 2:380–2; Charles A.L. Yate, "Port Arthur: Japanese Operations on Their Right Wing and in Centre, the 19th to the 22nd September 1904." In Great Britain, *The Russo-Japanese War*, 2:435–8.

35 Great Britain, O*fficial History*, pp. 65–9; Crawford, "Port Arthur," 2:386.

peror Meiji's birthday on 3 November, his forces continued to advance despite fierce counterattacks, aided by intensified engineering and mining operations.

Phase III: The Final Stage of the Land Siege and Capitulation

During November 1904, Nogi's continued failure to capture the forts, coupled with mounting casualties, caused increasing concern within the Japanese General Staff. The departure of the Baltic Fleet intensified fears that it might arrive in time to reinforce the Russian squadron at Port Arthur. In response, Field Marshal Ōyama sent his chief of staff, General Kodama Gentarō, to to review the situation and press Nogi to resume offensive operations.[36] Reinforced with additional troops, including the newly arrived 7th Division, Nogi now commanded more than 100,000 men. Yet another frontal engagement, the fourth and final general assault, led by Major General Nakamura Satoru on 26 November, proved costly again: approximately 4,500 Japanese soldiers were lost, compared with about 1,500 Russian casualties. The heavy losses compelled Nogi to shift his focus once more to 203 Meter Hil.[37]

On 28 November Nogi ordered a full-scale assault on the position, and over the following week more than 10,000 men were sacrificed in the effort. Despite arduous sapping operations up the steep, rocky slopes, the renewed attacks of 28–29 November brought the Japanese to within only some forty meters of the foremost Russian trench. In these frontal assaults, often conducted at extremely close range against fortified positions, Japanese infantrymen were portrayed in contemporary discourse as "human bullets" (Jpn. *nikudan*), expected to press the attack despite minimal chances of survival. The Russian defense, directed with tenacity and ingenuity by Colonel Nikolai Tretyakov, withstood repeated assaults, yet could not ultimately resist Japanese numerical superiority and relentless pressure. Finally, on 5 December, the hill's defenses collapsed.[38]

The struggle for 203 Meter Hill was the fiercest episode of the siege of Port Arthur and proved decisive for the course of the campaign. For weeks the Japa-

36 For the debate over Nogi's dismissal, see Chōnan Masayoshi, *Nichiro sensō rikugun shi* (Tokyo: Namiki Shobo, 2015), 526–31.

37 Smith, "Port Arthur," pp. 367–8. For the Japanese costly infantry attacks, see Nojine, *The Truth*, pp. 238–42.

38 Great Britain, O*fficial Histor*y, pp. 89–90; Crawford, "Port Arthur," 2:403–4.

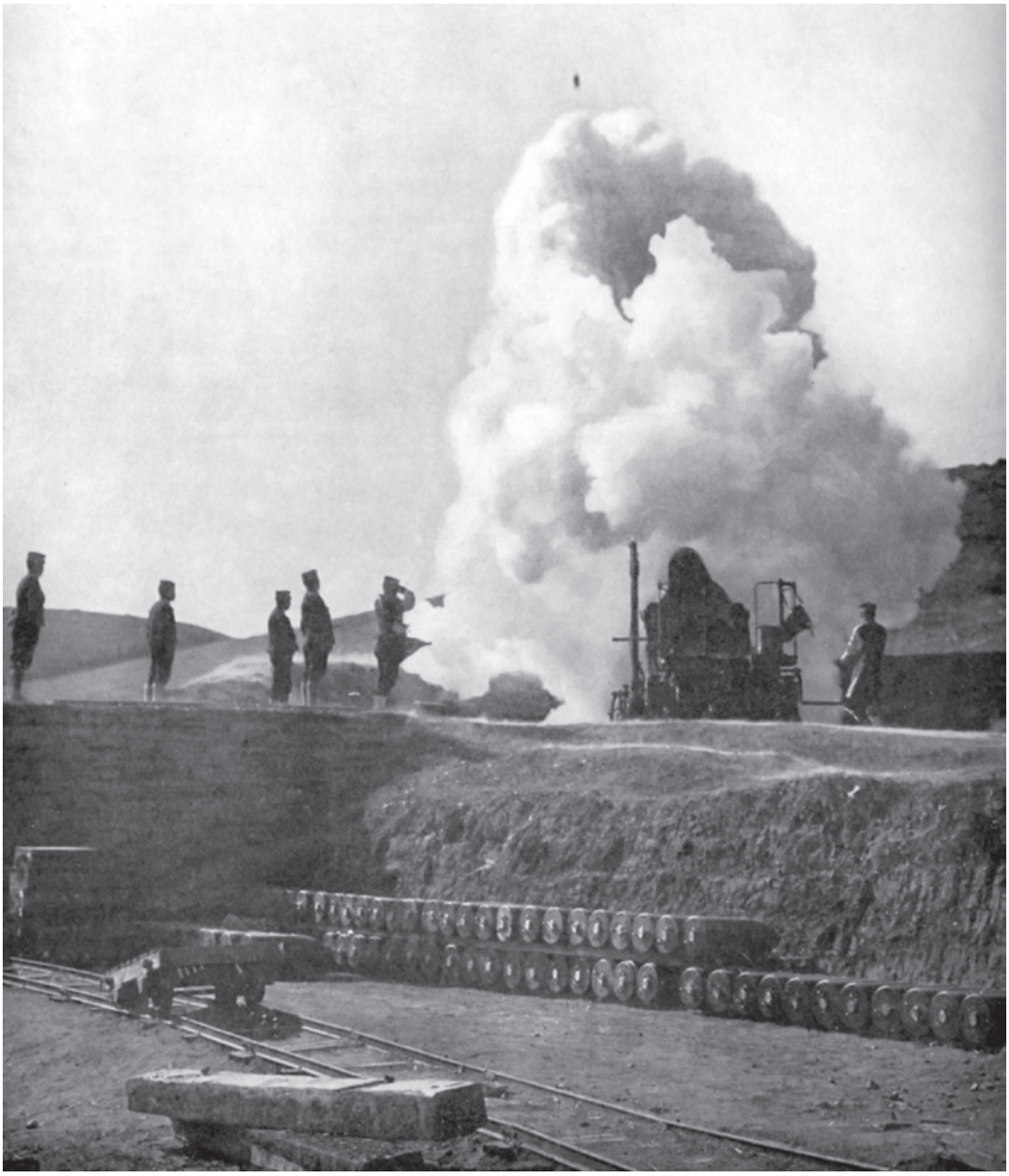


Figure 1. A competitive edge: a Japanese 280-millimeter howitzer in action. Source: James H. Hare, *A Photographic Record of the Russo-Japanese War* (New York: P. F. Collier & Son, 1905), p. 219

nese Third Army launched repeated assaults against the rocky height, confronting entrenched Russian defenses, dense barbed wire, and devastating artillery fire. Casualties mounted into the thousands as wave after wave of infantry attacks

Figure 2. The results of accurately directed artillery fire: Russian warships lying half sunken in Port Arthur Harbor shortly after its surrender. Source: Japan, *Meiji Sanjūshichi-hachinen Kaisen-shi*, vol. 2.

failed to secure the summit. Yet the hill's strategic value compelled the Japanese command to persist. Rising above the surrounding terrain, it offered a clear, unobstructed view of the harbor and the Russian Pacific Squadron anchored within it, a vantage point the attackers had previously lacked. On 5 December 1904 the hill finally fell, at a horrendous human cost. Japanese casualties in the struggle for this single position exceeded 12,000, while Russian losses were estimated at around 3,000. The scale of sacrifice for so small a piece of ground foreshadowed

the grim arithmetic of the First World War.[39]

After the battle, Nogi, whose second son was killed in the assault, composed a classical-style poem mourning both the fallen and the terrible price exacted by the hill, which had been transformed from a natural landmark into a landscape of iron and blood. With the fall of 203 Meter Hill, the operational balance shifted immediately. From the crest, Japanese spotters began directing heavy siege artillery with unprecedented accuracy. On 6 December, the bombardment intensified, and the Russian warships trapped in the harbor came under sustained and devastating fire, sinking one after another in its relatively shallow waters (see Figure 2). One vessel, the battleship Sevastopol, managed to withdraw to the relative safety of White Wolf Harbor and remain there for another month, but most of the remaining capital ships were sunk, crippled, or rendered inoperable.[40] The loss of naval mobility deprived the Russian defenders of their principal strategic asset and eliminated any realistic prospect of maritime reinforcement.[41]

Beyond the material destruction, the psychological repercussions were profound. The annihilation of the fleet signaled that the balance of power had irreversibly shifted. Russian morale deteriorated sharply as officers and soldiers alike recognized that the fortress had lost much of its strategic purpose. What had long been a grinding and costly stalemate now tilted decisively in Japan's favor. Control of 203-Meter Hill granted artillery dominance, superior observation, and growing confidence to the attackers, while the defenders faced an increasingly constricted horizon.[42] In retrospect, the battle for this single elevation demonstrated how terrain, visibility, and coordinated firepower could determine the outcome of modern siege warfare.

The defenders suffered another severe blow on 15 December, when Lieutenant General Roman Kondratenko was killed while supervising the defense of Fort Chikuan (see Figure 3). Kondratenko had shared the determination of his

39 Great Britain, O*fficial History*, pp. 91–9; Charles A.L. Yate, "Port Arthur: Japanese Operations on Their Right Wing and in Centre, the 19th to the 22nd September 1904." In Great Britain, *The Russo-Japanese War*, 2:467–71.

40 On the night of 2 January 1905, Captain Nikolai Essen scuttled the *Sevastopol* in sufficiently deep water to prevent it from being raised and salvaged by the Japanese, as had occurred with several other warships during the war.

41 Nojine, *The Truth*, 243–58.

42 United States, *Epitome*, p. 38.

superior, Lieutenant General Konstantin Smirnov, to continue the fight, and his death dealt a heavy blow to morale within the garrison, while at the same time strengthening General Stessel's position. Fort Chikuan fell to the Japanese four days later, while Fort Erhlung was destroyed by its defenders and subsequently overrun by the Japanese 9th Division on 28 December.[43] The entire eastern defensive line then unraveled in quick succession, with the capture of Fort Sungshu on 31 December and Wantai on 1 January 1905.[44] As his principal line of defense collapsed, Stessel concluded that further resistance was futile. Despite the willingness of many officers in Port Arthur, including Smirnov and Belyi, to continue fighting, he dispatched a messenger to General Nogi.[45]

The fortress capitulated on 2 January 1905 after brief negotiations. The Russian garrison, and General Stessel in particular, were physically and psychologically exhausted, and feared that the fall of the remaining defensive positions around the port would be followed by a systematic slaughter of their troops. Stessel therefore chose to surrender, even though provisions and manpower were far from depleted and thousands of soldiers remained fit for combat.[46] His decision later provoked sharp controversy in Russia and ultimately led to his court martial after his repatriation.[47] Although the surrendering officers were permitted to retain their swords and return to Russia, and 411 did so, including Stessel, most chose instead to accompany their soldiers into captivity in Japan.[48]

Nogi took particular care to ensure that the Russian troops were treated with dignity, and his respectful conduct toward Stessel in particular was widely noted and appreciated.[49] Following the fall of Port Arthur, Japanese forces found within the captured fortress 874 officers and 23,469 rank and file soldiers fit for

43 Great Britain, O*fficial Histor*y, pp. 110–16; Nojine, *The Truth*, pp. 274–91.

44 Great Britain, O*fficial Histor*y, pp. 117–20; Yate, "Port Arthur," 2:471–2.

45 Ellis Ashmead-Bartlett, *Port Arthur: The Siege and Capitulation* (Edinburgh: William Blackwood & Sons, 1906), 378–400, 448–67.

46 Great Britain, O*fficial Histor*y, pp. 121–4, 139–40; Crawford, "Port Arthur," 2:415.

47 For the findings of the court martial with this regard, see Great Britain, O*fficial Histor*y, pp. 141–5.

48 Crawford, "Port Arthur," 2:411. For the terms of the capitulation, see Great Britain, O*fficial Histor*y, pp. 135–8.

49 For tokens Frederic Villiers, *Port Arthur: Three Months with the Besiegers* (London: Longmans Green, 1905), p. 114.

duty or only lightly wounded, in addition to roughly 15,000 men who were seriously wounded or ill, as well as some 2,000 volunteers and civilians.[50] In total, approximately 40,000 of the original 47,000 defenders present at the outset of the siege survived. The Russians also left behind 546 field guns, 82,000 artillery shells, and roughly 2.27 million rounds of small arms ammunition.[51] Japanese losses during the siege were significantly higher. The Third Army suffered about 93,000 casualties, including 15,400 dead, 44,000 wounded, and 34,000 sick, a toll far exceeding the Russian total of approximately 31,300, of whom some 12,660 were killed or missing.[52]

The human toll of the Siege of Port Arthur revealed the brutal arithmetic of modern industrial warfare and the limits of purely tactical victory. Although the Japanese ultimately captured the fortress and seized vast quantities of matériel, their casualties were disproportionately high, nearly three times those of the defenders. This imbalance underscored the immense cost of repeated frontal assaults against prepared positions and demonstrated that battlefield success could come at a price that strained national resources and public tolerance. The fact that roughly forty thousand Russian defenders survived, many wounded or ill rather than killed, further highlighted the growing role of disease, exhaustion, and logistical breakdown alongside direct combat losses.

Outcomes and Lessons for Strategy and Fortifications

The success or failure of a prolonged siege often carries symbolic meaning. This was certainly the case with the siege of Port Arthur, though its implications extended far beyond symbolism. It is rare for the fate of a single fortified position to influence the outcome of an entire war, yet both Japan and Russia viewed Port Arthur in precisely these terms. Its capitulation was therefore greeted, in the belligerent countries and around the world alike, with either jubilation or apprehension. Strategically, the immediate impact was felt hundreds of kilometers to the north, where nearly 100,000 troops of the Japanese Third Army, previously

50 United States, *Epitome*, 40–1; Smith, "Port Arthur," 2:369; Crawford, "Port Arthur," 2:411. Frederic Villiers, *Port Arthur: Three Months with the Besiegers* (London: Longmans Green, 1905), p. 114.

51 Crawford, "Port Arthur," 2:413.

52 For partial table of casualties, see Great Britain, O*fficial History*, p. 133.

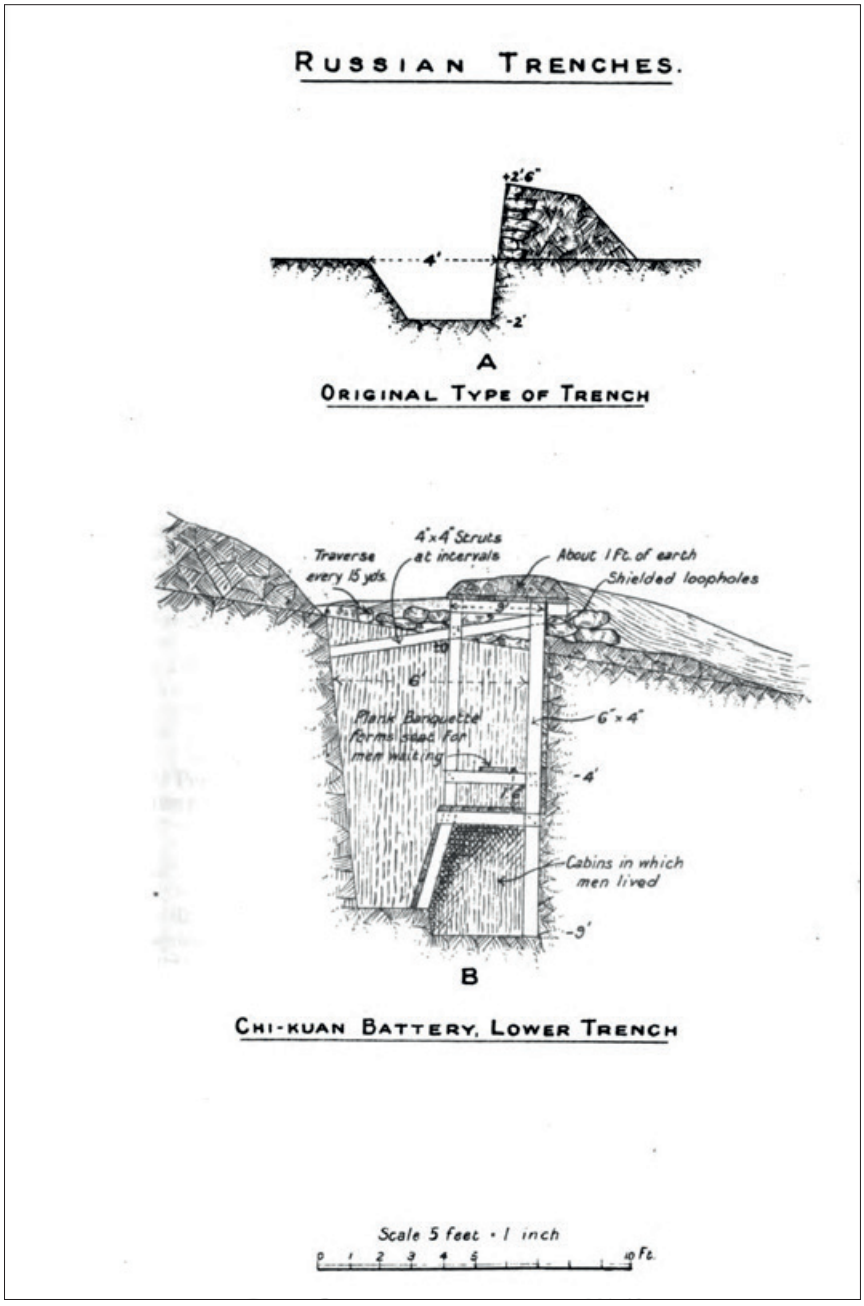


Figure 3. Diagram of Russian trenches at Fort Chikuan, Port Arthur. Source: Great Britain, *Official History*, pp. 26–7.

tied down by the siege, were released to reinforce other Imperial formations. Their redeployment contributed directly to the decisive Japanese victory over Russian forces at the Battle of Mukden two months later.

In the aftermath of the Russo–Japanese War, Russia's lease of Port Arthur passed to Japan. The town, renamed Ryōjun, became the administrative center of the leased Kwantung Peninsula, an area of roughly 3,500 square kilometers that included the port city of Dairen, today's Dalian, and served as the headquarters of the Kwantung Army (Jpn. *Kantōgun*). The naval base and the peninsula remained under Japanese control for more than four decades, until the closing days of the Second World War. After Japan announced its intention to surrender on 15 August 1945, Soviet forces participating in the invasion of Manchuria, Operation August Storm, advanced rapidly through Manchuria and the Kwantung Leased Territory. By the time they reached the port they encountered only limited resistance and completed its occupation on 24 August. The Soviet Union then assumed control of the naval installations and used Port Arthur as a major naval base. Formal agreements with the Chinese Nationalist government later in 1945 granted the Soviets joint use of the port, and an effective Soviet military presence continued there until 1955, when the base was finally returned to the People's Republic of China.

The Siege of Port Arthur offered a harsh yet decisive demonstration of the transformation of modern warfare at the turn of the twentieth century. The lessons it yielded extended across multiple domains:

Fortification and Artillery. The successful Japanese siege of Port Arthur did not render fortifications obsolete, but it starkly revealed the vulnerability of exposed, concentrated, and insufficiently layered defensive works to modern industrial firepower. During the siege, the Imperial Japanese Army deployed no less than 500 artillery pieces of various calibers, including 62 heavy howitzers and 160 mortars.[53] The sustained bombardment, combining high-explosive shells with increasingly accurate forward observation, enabled the attackers to demolish above-ground structures and neutralize gun emplacements at ranges previously unimaginable, even in the absence of airpower. The experience demonstrated that the decisive factor was not artillery caliber alone, but the

53 United States, *Epitome*, p. 42.

integration of firepower, observation, and communication, which together transformed siege warfare into a methodical process of systematic destruction rather than episodic assault.[54] The initial inability to locate, accurately observe, and effectively shell the principal targets of the siege, namely the warships anchored in the harbor, compelled the Japanese to deploy observation balloons, often with limited success, or to seize the surrounding high ground. [55] Within a few years, this limitation would be alleviated through the use of spotting aircraft.

Indeed, the siege demonstrated that artillery effectiveness depended not only on caliber but on observation, communication, and correction of fire. Forward observers, field telephones, signal systems, and optical instruments created an early form of networked warfare in which information, not merely guns, proved decisive. At the same time, the fortress's prolonged resistance and the severe casualties inflicted on the besiegers showed that defensive positions, when properly sited and supported, could still exact a heavy price. The principal lesson was therefore not the abandonment of fortresses but their redesign. Engineers increasingly rejected monumental, single-line works in favor of defense in depth, reinforced concrete structures, and extensive subterranean networks of galleries, shelters, and ammunition magazines.

Artillery batteries increasingly came to be dispersed, concealed, and integrated into the terrain rather than massed in conspicuous emplacements, designed to absorb, delay, and outlast rather than simply repel the attacker. Camouflage, low silhouettes, and redundant observation posts became essential design features, while reliable internal communications were increasingly recognized as indispensable for maintaining coordination under sustained bombardment.[56] Yet the lessons were not uniformly absorbed. In the years immediately following the war, sections of the French Army continued to undervalue the decisive role of

54 See, e.g., James M. Home, "General Report on the Russo-Japanese War up to the 15th August 1904." In Great Britain, *The Russo-Japanese War*, 3:209–10, 215–20, 265–76. For differing views of the role of artillery during the siege in France and Germany, see David G. Herrmann, *The Arming of Europe and the Making of the First World War* (Princeton, NJ: Princeton University Press, 1996), pp. 90–2; David T. Zabecki, *Steel Wind: Colonel Georg Bruchmüler and the Birth of Modern Artillery* (Westport, CT: Praeger, 1994, 1994), p. 11.

55 For the occasional Japanese use of balloons during the siege, see Great Britain, *Official History*, p. 329; Great Britain, *The Russo-Japanese War*, 2:383.

56 See, e.g., Great Britain, O*fficial History*, pp. 156–67.

heavy artillery, and the British Army was initially slow to expand its inventory of modern howitzers and high-explosive ammunition.[57] Port Arthur also underscored the importance of logistical endurance and close integration with mobile forces. A fortress could no longer function as an isolated bastion; it required secure supply lines, medical and sanitary infrastructure, and effective coordination with field armies and naval power. Anti-siege measures such as barbed wire entanglements, minefields, and overlapping fields of fire proved highly effective in slowing and channeling infantry assaults, and soon became standard components of twentieth-century defensive systems. Yet these obstacles alone were insufficient. Without defensive depth, mobility, and robust communications, even the strongest positions remained vulnerable to sustained artillery and systematic reduction.

Tactics and Engineering. A second lesson concerned the interplay of tactics, engineering, and operational persistence. Japanese success derived not only from careful planning and adaptive engineering, but also from sustained reinforcement and overwhelming artillery power. The seizure of key terrain, most notably 203-Meter Hill, proved decisive: from this vantage point observers directed accurate fire that neutralized the Russian fleet in the harbor and demonstrated the enduring strategic value of high ground, even against elaborate fortifications. At the same time, the severe losses incurred in early frontal assaults revealed the prohibitive cost of attacking prepared defenses without adequate reconnaissance and fire support. These setbacks also exposed the dangers of underestimating defensive depth and operating with incomplete intelligence. Ultimate progress came through methodical siegecraft: the gradual extension of trenches and saps, systematic mining, and closely coordinated artillery preparation, all adapted from classical principles to modern industrial conditions.[58] The experience underscored the growing importance of accurate mapping, systematic scouting, and, in later conflicts, aerial reconnaissance as tools for reducing uncertainty before launching assaults on fortified positions.

57 Yigal Sheffy, "A Model Not to Follow: The European Armies and the Lessons of the War." In *The Impact of the Russo–Japanese War*. Edited by Rotem Kowner (London: Routledge, 2007), p. 261.

58 For mining, see Great Britain, O*fficial History*, pp. 157–8.

Strategy and Logistics. A third lesson concerned strategic coordination and logistics. The campaign around Port Arthur demonstrated the decisive effect of complementary sea and land operations. Japanese naval control isolated the fortress, disrupted Russian reinforcement and resupply, and secured maritime lines of communication, while land forces, once established on commanding heights, progressively neutralized the remaining Russian naval assets through accurate artillery fire. Although coordination between services was not always perfectly synchronized, their combined effect proved greater than the sum of their parts and underscored the growing necessity of multi-domain integration rather than reliance on a single arm. Equally important was logistical endurance. Both armies contended with the severe Manchurian winter, disease, and recurrent shortages, yet Japan's comparatively efficient transport and provisioning system, supported by secure sea routes and shorter lines of communication, enabled it to sustain offensive pressure throughout the siege.[59] This logistical resilience, coupled with relatively strong morale, demonstrated that prolonged offensive operations were possible even against a heavily fortified position defended by entrenched troops equipped with modern machine guns, provided that supply, reinforcement, and artillery support were maintained without interruption.

Russia, by contrast, faced chronic bottlenecks and delays stemming from extended overland supply lines and the limited capacity of the Trans-Siberian Railway, constraints that steadily eroded its operational flexibility and endurance. Viewed more broadly, the struggle over Port Arthur revealed the industrial character of modern war, in which victory could hinge on the continuous production and delivery of shells, explosives, and engineering materials as much as on battlefield maneuver. The siege thus illustrated that in prolonged operations the steady flow of men and matériel, coupled with interservice coordination, often outweighs tactical brilliance or heroic impulse. In this respect, Port Arthur foreshadowed the realities of the First World War, where endurance, logistics, and integrated firepower became defining features of modern positional warfare.

Morale. A fourth lesson concerned morale and its political consequences. The siege demonstrated that cohesion, credible leadership, and sustained morale

59 For French lessons about the capacity for offensive, Michael Howard, "Men Against Fire: The Doctrine of the Offensive in 1914." In *Makers of Modern Strategy*, edited by Peter Paret (Princeton: Princeton University Press, 1986), p. 520.

are as vital to both attack and defense as weapons or fortifications, while internal disunity can weaken a position more effectively than enemy fire.[60] Contemporary observers often praised the Japanese fighting spirit and contrasted it with what they perceived as Russian passivity. In reality, Russian resistance at Port Arthur was far from uniformly weak, and many units fought with determination. Nevertheless, the defense was gradually undermined by divided command structures, rivalry among senior officers, and the psychological strain of prolonged attrition and isolation.[61] At the same time, the defenders faced an opponent prepared to sustain heavy losses, a readiness for sacrifice for which Nogi was criticized both by contemporaries and later historians.[62] The fortress's fall also had significant political repercussions. It deepened public disillusionment in Russia, reinforced perceptions of governmental incompetence, and contributed to the unrest that culminated in the upheavals of 1905. Thus, the loss of Port Arthur became not only a strategic defeat but also a catalyst for domestic crisis.

Coastal Fortresses. A fifth lesson concerned the evolving role of coastal fortresses. For this sort of fortresses in particular, observers did not conclude that fortification had become obsolete after Port Arthur; rather, they recognized that massive, isolated harbor strongholds had lost their former autonomy and could no longer guarantee maritime security on their own. The siege demonstrated that coastal defenses retained strategic relevance around vital ports and naval chokepoints, yet it also exposed the vulnerability of fixed batteries and harbor works when deprived of naval support, mobile field armies, and effective long-range artillery. The emerging consensus was that coastal fortresses had to operate as nodes within broader defensive systems, linked by railways, telegraph and increasingly wireless communications, and coordinated with both fleet move-

60 For British emphasis on the importance of morale, see Philip Towle, "British Observers of the Russo-Japanese War." In *Aspects of the Russo-Japanese War*, edited by Stuart Lone and Philip Towle (London: Suntory & Toyota International Centres for Economics and Related Disciplines, 1998), p. 27; Tim Travers, *The Killing Ground: The British Army, The Western Front and the Emergence of Modern Warfare, 1900–1918* (London: Allen & Unwin, 1987), p. 87.

61 For German assessments concerning alleged Russian low morale and leadership quality, see Mackenzie, "Willpower or Firepower?" p. 33.

62 See, e.g., Matsusaka, pp. 192–3, 196; Danny Orbach, "Nogi Maresuke." In *The Worst Military Leaders in History*., edited by John M. Jennings and Chuck Steele□ (London: Reaction Books, 2022), pp. 235–52. For a favorable view of Nogi, see Chōnan, *Nichiro sensō rikugun shi*, 526–31, 537–9.

ments and land operations. This transformation was evolutionary rather than abrupt, as many powers continued to invest in large coastal works while revising their doctrine and engineering methods.

After 1904, many powers expanded rather than abandoned coastal fortifications, redesigning them in accordance with the lessons of Port Arthur. The United States, under the Taft Program, strengthened harbor defenses and those protecting the Panama Canal; Germany reinforced Heligoland and other major naval bases; France and Belgium modernized coastal and ring forts with reinforced concrete; Russia rebuilt the defenses of Vladivostok; and Japan expanded the coastal batteries of its home islands. These reforms emphasized dispersion, underground protection, improved fire control, and closer coordination between naval and land forces.[63] In this sense, the fall of Port Arthur did not mark the end of the coastal fortress but a transformation in its function, from a standalone guardian of the shoreline to an interconnected, technologically supported element within a broader maritime defense network suited to the industrial age.

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63 For the American fortifications, see Turk, "Defending the New Empire," pp. 186–204.

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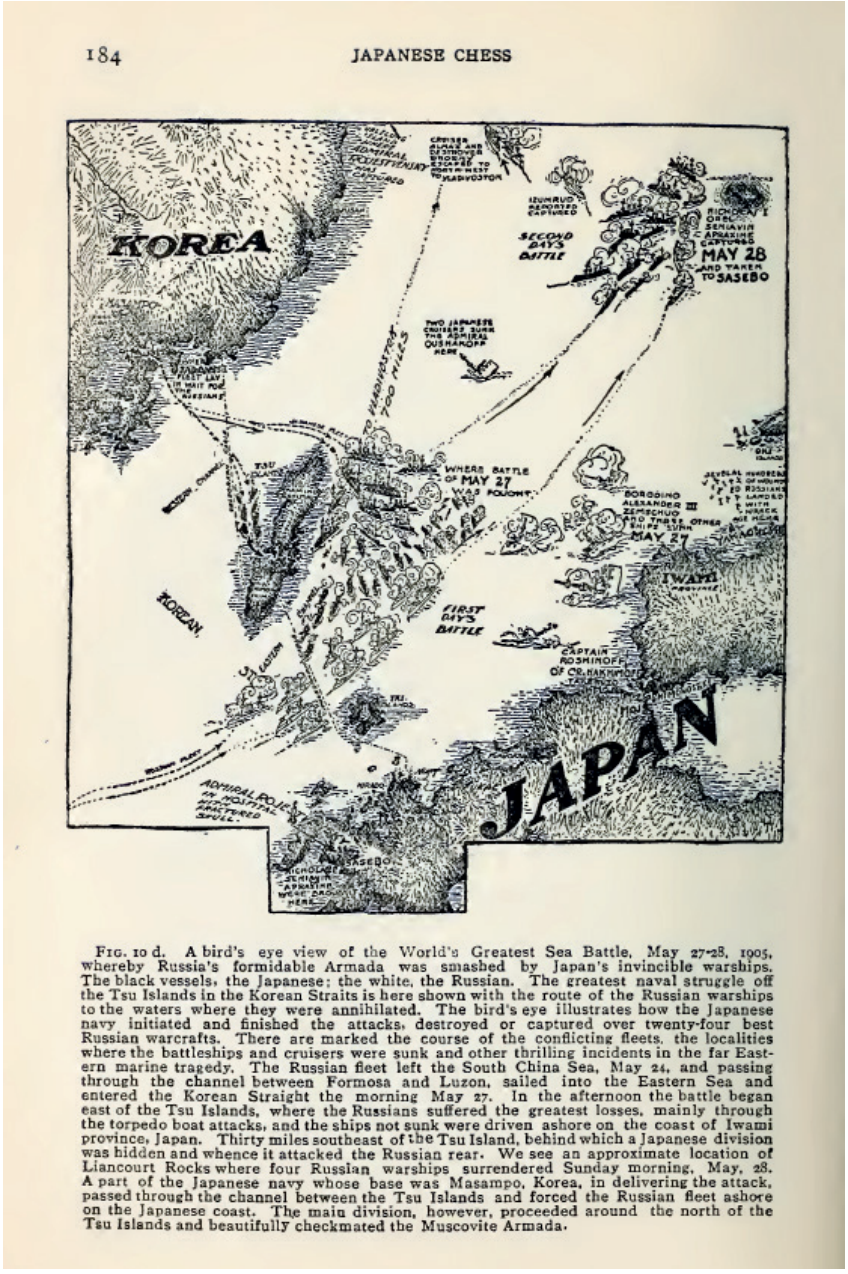

FIG. 10 d. A bird's eye view of the World's Greatest Sea Battle, May 27-28, 1905, whereby Russia's formidable Armada was smashed by Japan's invincible warships. The black vessels, the Japanese; the white, the Russian. The greatest naval struggle off the Tsu Islands in the Korean Straits is here shown with the route of the Russian warships to the waters where they were annihilated. The bird's eye illustrates how the Japanese navy initiated and finished the attacks, destroyed or captured over twenty-four best Russian warcrafts. There are marked the course of the conflicting fleets, the localities where the battleships and cruisers were sunk and other thrilling incidents in the far Eastern marine tragedy. The Russian fleet left the South China Sea, May 24, and passing through the channel between Formosa and Luzon, sailed into the Eastern Sea and entered the Korean Straight the morning May 27. In the afternoon the battle began east of the Tsu Islands, where the Russians suffered the greatest losses, mainly through the torpedo boat attacks, and the ships not sunk were driven ashore on the coast of Iwami province, Japan. Thirty miles southeast of the Tsu Island, behind which a Japanese division was hidden and whence it attacked the Russian rear. We see an approximate location of Liancourt Rocks where four Russian warships surrendered Sunday morning, May, 28. A part of the Japanese navy whose base was Masampo, Korea, in delivering the attack, passed through the channel between the Tsu Islands and forced the Russian fleet ashore on the Japanese coast. The main division, however, proceeded around the north of the Tsu Islands and beautifully checkmated the Muscovite Armada.

Cho-yo, *Japanese chess (sho-ngi) : the science and art of war or struggle philosophically treated : Chinese chess (chong-kie) and i-go,* New York : The Press club of Chicago, 1905, p. 184.

The Maginot Line

Architecture, engineering and urban planning.

by Kevin Passmore

Scholars take for granted that medieval and early modern fortifications combined architectural aesthetics with military purposes and the projection of power. Perhaps because they assume that modernity means the subordination of form to function, they have less to say about modern fortification. Thus, Paul Hirst, in his stimulating history of fortification architecture, surveillance and power, confines himself to military matters when he arrives at the Maginot Line.[1] That its twenty *gros ouvrages* (artillery forts) and twenty-nine *petits ouvrages* (machine-gun and mortar forts) were buried deep underground does not encourage interest in their aesthetics. The author of a survey of military architecture comments that, 'paradoxically and symbolically, fortification that was hitherto visible and thus dissuasive, became "furtive" and its architecture "transparent".[2] In reality, the Maginot Line was as architecturally significant as its precursors were, not least because it was conceived during a short-lived openness to modernism.

The first plans were drawn at the height of the prosperity, optimism and international reconciliation of the late 1920s, during which the neoclassical tradition of French state architecture was updated with a modernism. The latter incorporated the centralised management, and standardised, rationalised, construction methods of the so-called 'sciences of organisation'. The fortifications' social purpose was to restore hierarchical command, threatened by dispersal of soldiers on modern battlefield, the attraction of communism to the troops

1 Paul Hirst, 'The Defence of Places: Fortifications as Architecture [Part 1],' *AA Files*, 33 (1997), 13–26; Paul Hirst, 'The Defence of Places: Fortification as Architecture [Part 2],' *AA Files*, 34 (1997), pp. 6–17.

2 Maxime Azan, 'L'architecture militaire au service de la représentation de l'État,' *Inflexions* 42:3 (2019), pp. 202, 204.

and of autonomism to German dialect-speakers in Alsace-Lorraine, where the fortifications were largely constructed. Planners also expected that cheap mass production would improve troops' conditions, thus fighting communism at its roots and improving productivity [rendement] under fire.

No sooner was construction underway than the world economic crisis shook faith in mass production and reduced the funds available for grandiose, not to say hubristic, plans. Simultaneously, the left's electoral victory of 1932, brought to power military experts who had always opposed permanent fortification. These circumstances allowed infantry officers and younger military engineers to reshape the fortifications. They saw intuition and sensitivity to locality as more important than neoclassical rationality and were open to the ruralism and 'modern regionalism' of 1930s domestic architecture. Thus, in the course of design and construction, initial plans for massive, centralised forts gave way to 'ouvrages palmés' (webbed forts) – a series of individual batteries dispersed in the terrain, linked by long underground galleries to underground power plants, command centres, barracks, first-aid stations and kitchens at the rear. The same regionalist trend was clearer still in the design of the new 'security camps' close to the forts. No orders were given for this dramatic change, and it did not entirely displace neoclassicism or modernism. Understanding how it happened requires reconstruction of the evolving training of military engineers and artillery officers and of social and doctrinal conflicts within the army. Limited promotion prospects in the overstaffed interwar officer corps provoked resentment at the 'aging' high command. The outcome was an mix of styles, distant from the first plans.

The neoclassical legacy

The senior officers who in 1926 to 1930 formulated the first fortification proposals were trained in the 1880s and early 1890s at the prestigious École Polytechnique. Étienne-Honoré Fillonneau, Charles Belhague and Robert Normand graduated in 1887, 1892 and 1894 respectively. All three began their careers constructing colonial infrastructure, fought in the Great War, and the first two subsequently commanded the Polytechnique.[3] This school, founded by Napoléon I, was among several that educated the Corps d'État: the engineers,

3 Fillonneau, dossier personnel, 14YD480, SHD.

administrators and military engineers who administered the Jupiterian French state, built railways, electrical grids and telephone networks converging on Paris, and constructed neoclassical town halls and railway stations in the provinces.[4] At the Polytechnique, our future generals took an obligatory course delivered by Professor of Architecture Fernand de Dartein, whose teaching relied heavily on that of his predecessor, the neoclassicist Léoncé Reynaud. Syllabuses covered metal, wood, and stone structures, but only the latter were accompanied by lectures on the history of architecture and practical exercises in drawing antique forms.[5]

The neo-classical fortifications of the Marquis de Prestre de Vauban, Louis XIV's great fortifier and besieger, were an obligatory reference point in this education. Vauban's lower, thicker structures provided better protection against artillery than high medieval walls. Elaborate bastions and tenailles allowed calculated fire on all angles of attack. Politically, Vauban's fortifications marked the frontier of the emerging absolutist territorial state in contested borderlands such as Alsace and Lorraine. They also expressed the 'measure' of the absolutist state and the harmonious, rational order that supposedly ensured that warfare remained humane. Socially, these principles were embodied in Vauban's model fortified cities, such as Neuf-Brisach. Note, however, that in practice Vauban did not ignore locality. Terrain and geology were too quirky, and there was no alternative to local material and artisan know-how.[6]

Polytechnique graduates on the military pathway then progressed to École d'application de l'artillerie et du génie at Fontainebleau (where they joined officers from other schools, who constituted the great majority of Génie officers, but had little hope of a senior position). Vauban was important there too – after

4 Cecil O. Smith, 'The Longest Run: Public Engineers and Planning in France,' *The American Historical Review* 95:3 (1990), pp. 657–92.

5 Estelle Thibault, 'Continuités et transformation d'un dispositif pédagogique: Enseigner l'architecture à Polytechnique (1867-1910),' in *L'Atelier et l'amphithéâtre : les écoles de l'architecture, entre théorie et pratique*, ed Estelle Thibault and Guy Lambert (Paris, 2011), pp. 131–72.

6 Stéphane Perreon, 'Les fortifications de Vauban au cœur de l'architecture et de l'art du Grand Siècle,' in *La guerre et les arts*, ed. Jean Baechler (Paris, 2018), pp. 13–24; Jean-Jacques Rapin, *L'esprit des fortifications: Vauban, Dufour, les forts de Saint-Maurice* (Genève, 2003), p. 13; Peter Sahlins, 'Natural Frontiers Revisited: France's Boundaries since the Seventeenth Century', *The American Historical Review* 95:5 (1990), pp. 1423–51.

all, he had founded the Corps du Génie militaire. But neoclassicism was combined with new technical priorities, for our generals' training coincided with the construction of General Adolphe Séré de Rivières's 'iron barrier' – a chain of frontier fortifications including the complexes of Verdun, Toul and Épinal – necessary because Vauban's Alsace-Lorraine fortifications had been lost to Germany following the 1870–1 war. The increased range of rifled artillery necessitated the construction of detached forts, enclosing regions, thus keeping the enemy out of range of population centres. Bastions vulnerable to enfilading fire were replaced with defensive ditches, covered by caponiers within them. Soon after construction began, new penetrating shells rendered masonry fortifications obsolete. However, the invention of industrial-scale reinforced concrete allowed some forts to be protected with layers of concrete and earth, sometimes with the addition of turrets.

Although technical priorities obviously fashioned Séré's forts, neoclassical harmony determined the pentagonal or hexagonal shape of individual *ouvrages*, which also reflected the assumption that fire plans could be symmetrical in an age where camouflage, crawling and hiding in undergrowth were considered unmanly. Neoclassical pilasters often embellished entrances. They coexisted with an industrial aesthetic that anticipated modernism: repetitive rounded arches resembling railway viaducts, arsenals and warehouses. This aesthetic opened the way to the dark side of Gothic romanticism, evident in the warrior-mask firing and observation slits on forts such as the Batterie de Sanchay (Figure 1), which were designed to terrorise attackers. Forts were still intended to be seen and embody power.

The Cours de fortification, taught at the École d'application, combined classical language with exposition of technical matters such as the effects of explosive shells, the properties of armour, concrete, turrets, and siting forts in different terrains. It stated that in any modern fort, one finds standard elements—a central redoubt, polygonal perimeter folding into the terrain, perhaps with pseudo-bastioned form at the gorge, covering mathematically calculated fields of fire.[7]

7 Capitaine du Génie Alheilig, *Ecole d'application de l'artillerie et du génie*. *Cours de fortification*. *La fortification après 1885 : (officiers-élèves du génie)* (Paris, 1911), p. 82.

Figure 1 : The Batterie de Sanchay. Source, Romary/Trucs et machins CC BY-SA 3.0

The lessons of the Great War

The lessons of the Great War concerning fortification were endlessly disputed afterwards. Some officers opposed permanent structures. They pointed out that Séré de Rivières's complexes did not prevent the enemy from approaching Paris and appeared simply to attract artillery fire; only dispersal, trenches and camouflage provided protection. In 1915, Commander-in-Chief General Joseph Joffre ordered the removal of heavy weapons and incorporation of permanent fortifications into the line of trenches. The appalling conditions in the Verdun fortifications did not endear them to troops. Galleries stank of sweat, corpses, horses dead and alive, chlorine, urine, and damp cement. Heavy artillery impacts set off terrifying tremors through the whole structure, blew out kerosene

lamps, stopped generators, and filled the air with concrete and limestone dust.[8] Marshal Philippe Pétain amongst others concluded that permanent fortification was outmoded. The war over, he advocated the construction of field fortifications, including blockhouses, once war began.

Others countered that Verdun ultimately held out. They were impressed by the electricity, ventilation, and sleeping quarters that the Germans installed in the satellite fort of Douaumont during their brief occupation. In 1917, the French themselves added flanking casements, over-pressure to prevent gas from entering, and long underground galleries leading to entrances in the rear, where re-supply was safe from bombardment and troops could rest.[9] Through the 1920s, advocates and opponents of field and permanent fortifications argued. As Senator Albert Mahieu put it when reporting the fortification law, 'Everyone wanted to apply the lessons of the war, but nobody agreed what they were'.[10]

Command was a major issue in these disputes. Trench warfare was accompanied by dispersal of troops and devolution of tactical command to junior officers and NCOs. This revolution was partly made from below, and was resisted by senior officers. Postwar field regulations were a compromise between opposed views: they institutionalised tactical dispersal by dividing platoons into eleven-man combat groups, yet subjected them to strict rules to prevent improvisation. Most corps commanders continued to regret the degree of initiative left to those they called 'poorly educated men'.[11]

Another quite different lesson of the war further complicated the command question: the use of the sciences of organisation to wage a protracted, total conflict. Military staffs and civilian administrators, among whom Polytechniciens were prominent, manipulated mass armies and presided over the production and

8 Paul Jankowski, *Verdun: The Longest Battle of the Great War* (Oxford, 2014), pp. 139–41.

9 Jankowski, *Verdun*, p. 141; Lieutenant Jacques Péricard, *Verdun. Histoire des combats qui se sont livrés de 1914 à 1918 sur les deux rives de la Meuse* (Paris, 1933), p. 557; Henry Morel-Journel, *Journal d'un officier de la 74e division d'infanterie et de l'armée française d'Italie (1914-1918)* (Montbrison, 1922), 24 October 1916.

10 *Journal officiel: Débats parlementaires: Sénat*, 28 December, 1929, p. 1369.

11 Duport to War Minister, 4 Sept. 1925, Service Historique de la Défense [hereafter SHD] 9N306/3; Général Barrard, 'Réflexions sur nos règlements d'infanterie: Le Groupe et la section de F.-V'., *Revue d'infanterie*, 35 (1935), pp. 189–97.

transport of huge quantities of equipment.[12] Particularly important were Henri Fayol's system of centralised hierarchical management and F.W. Taylor's rationalised mass-production systems. After the war, older senior officers saw large artillery forts, 'organised' using these methods, as better guarantors of command than dispersed field fortification.[13] The sciences of organisation were easily combined with the state's centralising ethos.

Normand, as Director of Military Engineers at the War Ministry when the fortifications were planned, was emblematic of the neoclassical–modernist synthesis. Both his father and brother were eminent architects and representatives of the state elite. Robert chose the Polytechnique and army, but remained true to his father's neoclassicism. He wrote in 1928 that the École d'application, which he had recently commanded, was infused with the spirt of Vauban. He praised the unparalleled allure of its stables, achieved 'without decoration, by the simple character of its lines and the art of its proportions, which are the essence of architecture'. Nothing better demonstrated to future military builders 'a model to inspire the art of the beautiful without superfluous decoration'.[14] Normand was probably the author of a 1928 circular on taste in military construction, which mixed industrial building methods, neoclassicism and regionalism. While it rejected the international style and standardisation in the name of tradition and local styles and materials, it counselled Génie officers not to descend into 'irrational fantasy'. Buildings must be 'tasteful' and contribute to the 'education of the nation, an objective not contrary to the requirement for robust simplicity that is the mark of military construction'.[15] Normand saw the same combination of the beautiful and the truth of platonic essences in neoclassicism and modernism. Architecture was for him a 'simple question of lines and proportions, for which the employment of a new material, reinforced concrete, allows new audacities-but evolution, not revolution'. Arguably, evoking neoclassicism legitimated modern constructions.[16]

12 Stéphane Rials, *Administration et organisation: De l'organisation de la bataille à la bataille de l'organisation dans l'administration française* (Paris, 1977), pp. 56–106; S. D. Carls, *Louis Loucheur and the Shaping of Modern France* (Baton Rouge, 1993), pp. 15–93.

13 'Note sur les forms de la fortification,' p. 11, 9 September 1927, 1N29/4, SHD.

14 Robert Normand, 'Nos Grandes Écoles: L'école du Génie,' *Revue des Deux Mondes*, 50:1 (1929), p. 183.

15 'Circulaire ministérielle du 10 July 1928', *Revue du génie militaire*, 63 (1928), pp. 371-2.

16 General Normand, 'Architectes militaires italiens', *Revue du génie militaire*, 60 (1927), pp.

Officers and modernist architects exchanged ideas. The avant garde architect, Le Corbusier, admired the ideal proportions, order and clarity of the classical tradition so long as it avoided the 'aridity' of 1920s pastiches; he praised Vauban for having blurred the engineer-architect boundary.[17] Taylorism was integral to Le Corbusier's architecture, as were 'urbanisation and habitation plans that respond to most of the requirements of anti-aircraft defence'.[18] Lt-Colonel Vauthier, an enthusiast for strategic bombing, saw Le Corbusier's and Auguste Perret's proposed segregation of work and habitation as essential to distance residences from attacks on factories.[19] Senior officers were also aware that modernist urban planners advocated mass production of cheap, comfortable working-class residences distant from insalubrious factories, to which they were linked by high-speed transport; 'modern comfort', was meant to improve productivity and eliminate communism at its root. This socio-political program was not original, for the older garden-city movement envisaged functional separation for similar reasons. Modernists differed in locating housing and offices in skyscrapers, but were just as concerned to provide workers with 'modern comfort' and green spaces – they never systematically dismissed locality.[20]

Early plans, command and power

In November 1926, the Comité de défense de la frontière (CDF) presented the first plans for fortification to the Conseil supérieure de la Guerre (CSG), which was responsible for determining military priorities within the framework of government policy. At that moment, strengthening state authority and hierarchical

394-425.

17 'Le plan et la construction sont-ils en fonctions de la destination du bâtiment?,' *L'architecture d'aujourd'hui*, '8 (1937); Le Corbusier, '*Pour batir, standardiser et Tayloriser', Cahiers du redressement français*, 1 May 1928; Mary McLeod, 'Urbanism and Utopia. Le Corbusier from regional syndicalism to Vichy' (Ph.D., Princeton University, 1985), pp.18, 39, 147–48.

18 Jean-Louis Cohen, *Architecture en uniforme : Projeter et construire pour la Seconde Guerre mondiale*, trans. Julie-Anne Ricard (Paris, 2011), 23.

19 Lieutenant-colonel Paul Vauthier, *Le Danger aérien et l'avenir du pays* (Paris, 1930), pp. 244–47. Similar ideas were popularized in Louis Bance, 'Fortification et architecture', *La Nature*, 1 August 1931.

20 Mary McLeod, 'Architecture or Revolution: Taylorism, technocracy, and social change,' *Art Journal* 43:2 (1983), pp. 132–47.

command appeared particularly important.[21] A powerful cross-party autonomist movement had appeared in Alsace-Lorraine, resentful of the centralising state's imposition of French in the administration, courts and schools. The political and military authorities, responded with surveillance and repression, for they saw autonomism as a German plot. Countering autonomism influenced the positioning of the *ouvrages*. In the CSG, Pétain, in accordance with his doctrine of deep defence, envisaged only destructions and warning posts on the frontier, with a resistance line and second position on pre-1914 German and French fortifications either side of the pre-1918 border. General Boichut remarked that Pétain's proposal would lose Alsace. As the CSG's inspector of VI and XX Corps in the province, he was well aware of antimilitarism there. Instead, the CSG backed the CDF's proposal for powerful artillery forts on the frontier.[22] Subsequently, Prime Minister Raymond Poincaré urged the army to demonstrate that Alsace was defended. Like Vauban's forts, the future Maginot Line asserted the power of the state both to the French people and foreign enemies.[23]

Another reason to prioritise command was that in 1929, military service was reduced to one year. The CDF opined that the resistance of fortifications was likely to be greater than that of troops trained for a single year. Not only must field units shelter under the guns of the forts, but troops manning the forts themselves must be under the direct supervision of officers.

This requirement informed the centralised model fort that accompanied the CDF proposal. It comprised a symmetrical bloc of concrete plus linked flanking casemates, surrounded by a ditch with a concrete counterscarp to the front. It differed from Séré de Rivières's forts in being only 25 meters deep and 120 meters wide, thus reducing the probability of a direct hit from shells arriving frontally. The CDF was uncertain on the advisability of a long underground gallery leading to air intakes, services and accommodation to the rear, for some officers feared that long galleries would undermine command. The model fort did not include such a gallery and the CDF did not rule out accommodating troops in the

21 CDF, 'Rapport au ministre', 26 November 1928, 1N28/8, SHD.

22 Procès-verbaux (P-V) CSG, Séance, 1N29/3, 4/7/1927 SHD; Boichut, Extrait du Rapport, 6 December 1928, 286 D 98, Archives départementales du Bas-Rhin.

23 P-V CSG, 18 January 1927, 1N29/1, SHD; Painlevé to Poincaré, 17 January 1929, 17N3763/3, SHD.

fort itself..[24] Pétain urged the CDF to produce a range of cheaper forts. In May 1927, the CDF duly presented a catalogue of ten forts and shelters, all but one of which were still centralised.[25]

The exception, inspired by an earlier design of Lt-Colonel Tricaud, commander of the 6th Génie Regiment, was the '*ouvrage palmé*'. This design was presented as a possibility in the first CDF proposals, but reserved for exceptional circumstances. It overcame a significant disadvantage of centralised forts. Every hit was a bullseye; although damage was usually limited, the whole garrison was disturbed by violent reverberations.[26] The *ouvrage palmé* contained shock waves by separating weapons into small reinforced-concrete combat blocs. They were easily camouflaged in the terrain, and if one bloc fell, the others would not. New blocs could be constructed as required. Combined with galleries to the rear, the plan resembled a bird's foot – hence the name, 'ouvrage palmé' [webbed fort]. Having failed to prevent the construction of *gros ouvrages*, Pétain approved the *ouvrage palmé* because it achieved the dispersal he valued.

Fillonneau remained sceptical. In a new consultation, he rejected Tricaud's plan because it lacked a ditch, howitzers, and a gallery leading to the rear'.[27] However, given Pétain's view, he could not avoid including an *ouvrage palmé* (with the addition of the missing elements) in a new catalogue of ten models. In October 1927, when the CSG discussed it, Fillonneau claimed implausibly and disingenuously that he had conceived the *ouvrage palmé* himself in February 1918, while standing on the destroyed Verdun glacis. The meeting concluded that centralised works were appropriate in open country and the *ouvrage palmé* in rough terrain.[28]

Fillonneau remained in a strong position to impose centralisation, for on 30 December 1927, he became president of the body charged with drawing up de-

24 PV CDF, 27 May 1926, 7N3757/2, SHD; PV CDF, 3 February 1927, 7N3757/3, SHD.

25 'Note sur les forms de la fortification,' 16 May 1927, 1N29/3, SHD.

26 Lt-Colonel M. Tricaud, 'La fortification permanente actuelle,' *Revue du génie militaire*, 53 (1923), pp. 469–92.

27 'Note lu au CSG,' 4 July 1927 SHD 1N29/3; Général Paul-Émile Tournoux, *Haut commandement, gouvernement et défense des frontières du Nord et de l'Est, 1919-1939,* (Paris, 1960), pp. 86–89; Jean-Yves Mary and Alain Hohnadel, *Hommes et ouvrages de la ligne Maginot* (Paris, 2000), 1, p.18.

28 P-V CSG, 12 October 1927, 1N29/4; 'Rapport au ministre,' 9 September 1927, 1N52/6, SHD.

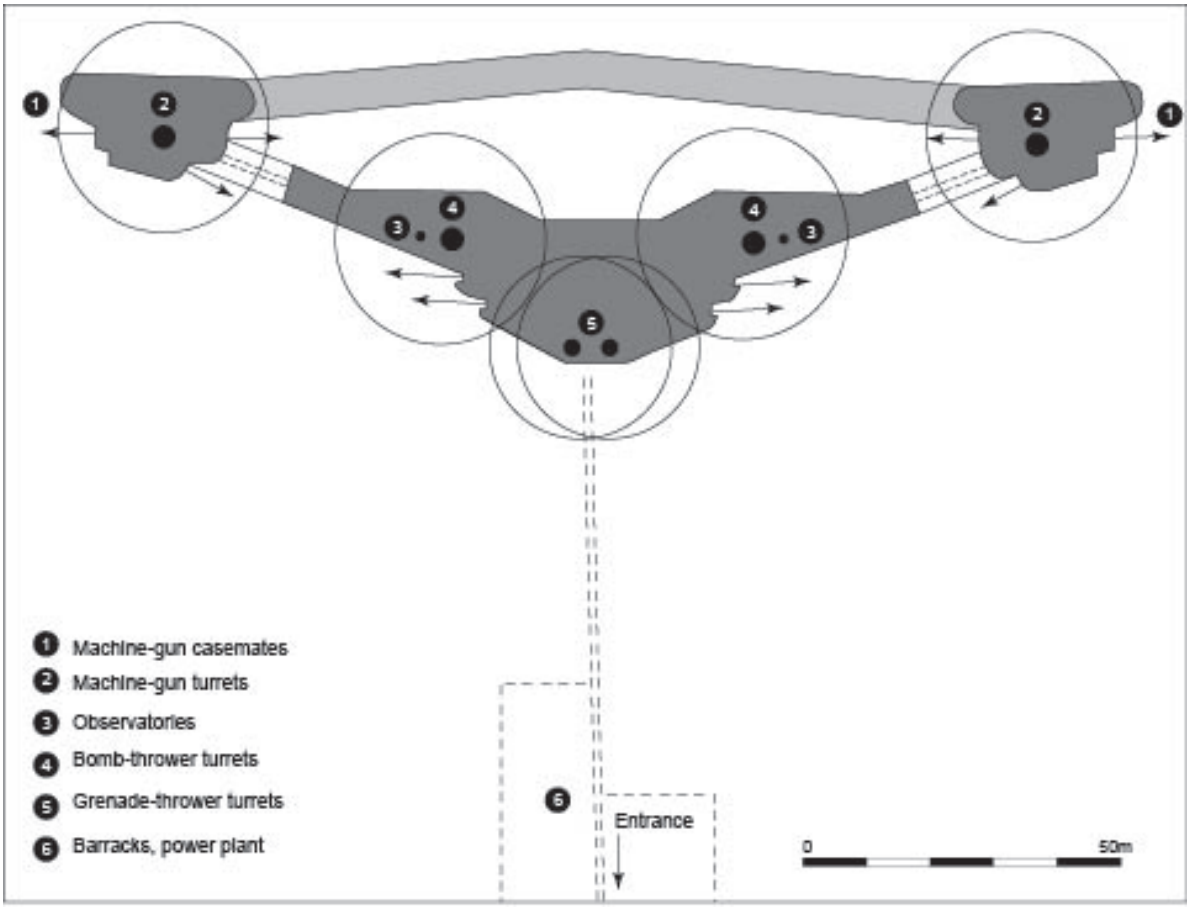

Figure 2 : GO-Simserhof, first plan. Adapted from Truttmann and Lisch, La muraille de *France*, 76, by Kirsty Harding, Cardiff University.

by Kirsty Harding, Cardiff University

tailed specifications – the Comité d'organisation des régions fortifies (CORF). In March 1928, the CORF produced yet another set of ten models which ignored the CSG's instructions. *Ouvrages palmés* were reserved for exceptional circumstances.[29] The plans for the first *ouvrages* were all versions of centralised model 2. Yet in the course of construction, all the artillery forts on the Alsace-Lorraine front became *ouvrages palmés*.

29 'Rapport,' 12 March 1928, 7N3670, SHD.

From ouvrage centralisé to ouvrage palmé

Take *gros ouvrage* Simserhof on the left flank of RF-Lauter on the northern fringe of the Lemberg Forest. Work on the plans began in the summer of 1928, when the technical forms of fortification were still not decided. On the debatable grounds that the terrain was flat, the CORF decided on a centralised *ouvrage.* The first draft, dated 7 June 1929, was the work of Colonel Charles Frossard, head of CORF's Strasbourg Delegation, who had attended the Polytechnique in the 1890s (Figure 2). It was based on Plan N° 2 in the CORF catalogue, a slightly elongated version of the CDF's first model, surrounded by a lozenge-shaped ditch protected by a concrete counterscarp, counterscarp batteries and barbed wire. A gallery led to entrances in the forest.

By July, when the CORF considered these plans, Fillonneau had retired. His successor, General Charles Belhague, proved just as committed to centralised forts. Members nevertheless felt that Simserhof's proposed field of fire was inadequate, despite 'rectifying' the edge of the forest by felling thirty-eight hectares of trees. Infantry general Robert Guitry, who had opposed giving the CORF excessive powers, suggested constructing an *ouvrage palmé* instead. Belhague brushed him aside, proposing instead two half-forts from the CORF catalogue. After a site visit confirmed this choice, Frossard drew a second plan, which the CORF and War Ministry approved on 24 September.[30] The plans were then returned to the CORF Delegation in Strasbourg, now transformed into a Direction des Travaux (Directorate of Works). In the course of construction, the half forts were broken into a single *ouvrage palmé* – eight combat blocs linked by a Y-shaped gallery (Figure 3). The evolution of Simserhof's form was not an exception, for, in the course of construction, all the artillery forts in the North-east became *ouvrages palmés*. We have only circumstantial evidence about why this happened..

Firstly, costs had to be reduced. In December 1929, as the budget was trimmed before presentation to parliament, the counterscarp and ditches were eliminated from all Model 2 forts, as War Ministry Director of Engineers Normand had

30 P-V CORF, 1 July 1929, 7N3762/5, SHD; Correspondence and plans, 7N3822/8 SHD; Philippe Truttmann and Frédéric Lisch, *La muraille de France ou la ligne Maginot* (Thionville, 2009).

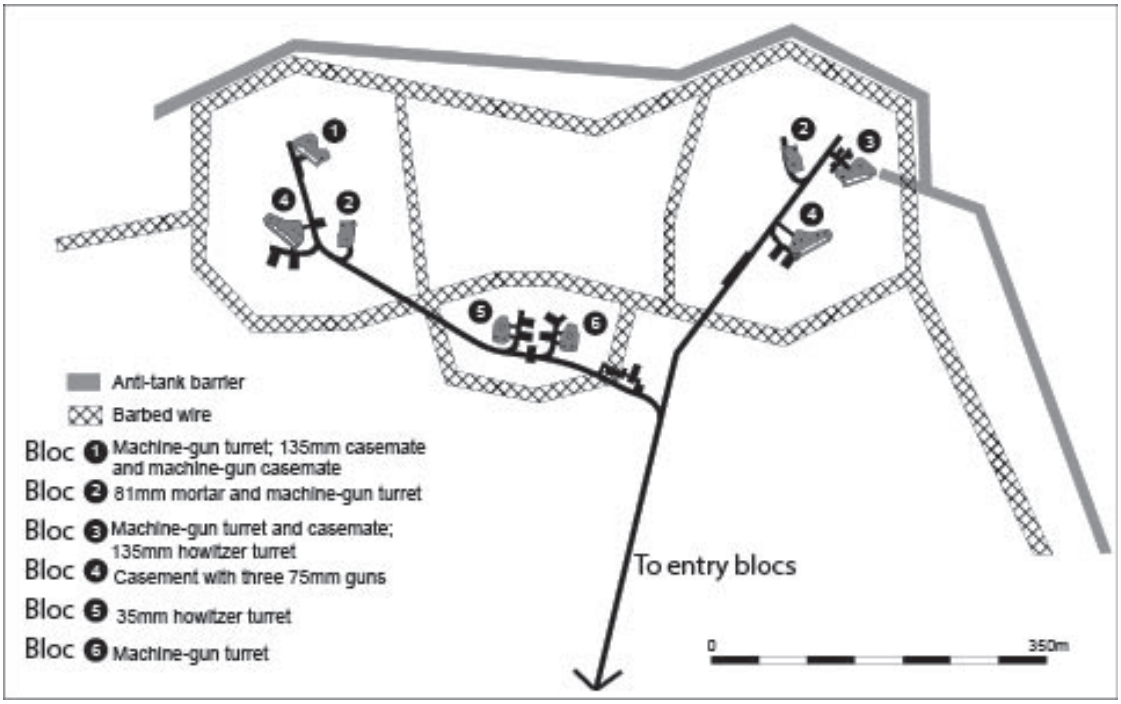
Anti-tank barrier
Barbed wire
Bloc 1 Machine-gun turret; 135mm casemate and machine-gun casemate
Bloc 2 81mm mortar and machine-gun turret
Bloc 3 Machine-gun turret and casemate; 135mm howitzer turret
Bloc 4 Casement with three 75mm guns
Bloc 5 35mm howitzer turret
Bloc 6 Machine-gun turret
To entry blocs
0
350m

Figure 3 : GO-Simserhof, final form. Adapted from Truttmann and Lisch, *La muraille de France*, 77, by Kirsty Harding, Cardiff University

suggested to War Minister Paul Painlevé in the previous year.[31] As the world economic crisis hit France, cost-cutting became even more important. Although proponents of centralised forts saw *ouvrages palmés* as too costly, it was in fact possible to save money simply by not constructing all the planned blocs. At Hackenberg, only seventeen of twenty-four blocs made it off the drawing board.

Secondly, as plans were drawn, the centralising, scientific principles of the CORF came under converging political and military fire. In November 1928, the moderate-left pacifist politician and decorated war veteran, Pierre Cot, published a widely-read article in which he condemned permanent forts as 'ruinous and ineffective' relics of Vauban. He insisted that field fortification, machine guns, mobility and camouflage were more effective means of defence and con-

31 'Rapport', Normand, 31 July 1928 and 'Suite à note', 6 August 1928, 7 N 3781/1/10 & 11, SHD.

centrating fire.[32] His article triggered a long controversy in the military newspaper, *La France militaire*, which revealed deep divisions among officers.[33] Advocates of field fortification often counterpoised their conviction that war was an 'art' to the learned arms' scientific outlook. As Captain Lucien Souchon put it in an anonymously published book that future war minister, Édouard Daladier, cited in the crucial parliamentary debate about fortification, 'according to the temperament of the artist, the forces and forms of nature take on the most astonishing aspects, in which the result of the effort is not always scientifically foreseeable'.[34] Although Souchon was influenced by the anti-rationalist philosophy of Henri Bergson rather than by architectural trends, his views parallelled the declining influence of neoclassicism in the Polytechnique and thus in Génie officers' training – the third reason for the shift to the *ouvrage palmé*.

In 1908, when Dartein retired from the Polytechnique, his neoclassicism was already retreating. The architecture course had recently been downgraded because it supposedly taught drawing skills more suited to the Écoles d'application. Dartein's successor, Gaston Umbdenstock, was appointed *chargé de cours*, rather than professor, because architecture was now only a compulsory-but-extracurricular course. However, the charismatic Umbdenstock's lectures were so successful that the School reinstated a full course – on condition that it was freed from Dartein's neoclassicism.[35] The new course was first taught in 1919, when Umbdenstock, now Professor Umbdenstock, returned from the trenches.

Umbdenstock did not reject neoclassicism outright, but he did criticise it for anticipating modernism, of which he was an outspoken critic. His condemnation of Vauban's monumental symmetrical barracks paralleled contemporary likening of modernist buildings to barracks. Umbdenstock had doubtless read the conservative critic Camille Mauclair, who denied that 'a + b means that you must live in a barracks and admire [modernists] on command', and added that a 'free man can only laugh when in pseudo-artistic milieux he hears [architects]

32 Pierre Cot, 'Des fortifications ou des mitrailleuses? Vauban ou Hotchkiss?', *La Renaissance*, 3 November 1928.

33 *La France militaire,* 3 January to 25 March 1929.

34 Anon., *Feue l'armée française* (Paris, 1929), pp. 34–9; *Journal Officiel*. *Débats Chambre*, 9 December 1929, p. 1358.

35 Thibault, 'Continuités', p. 32.

cry, "Left! Right!" like corporals teaching new recruits to goose-step' – implying that modernism was German.[36] Umbdenstock advocated instead combining 'elitist' neoclassicism with 'demotic' regionalism, romanticism and arts and crafts. He urged future military engineers to inspire heroism using 'secant effects' – dissymmetrical combinations of curves and straight lines, like bandoliers on uniforms. Flat planes had to be broken by upward-pointing elements, as in nature, whereas downward-facing features, were depressive. He favoured decoration, but condemned false arches, windows or brickwork for detracting from the "truth' of a structure – he turned against modernists' their claim that clean lines reflected a structure's engineering.[37] General André Metz, director of the Génie's technical review during the 1930s, who had experienced Umbdenstock's teaching in 1910-12, remembered that he taught officers to be artists in the purest sense, and that aesthetically sound military architecture produced an emotional response and 'acted on the soul'.[38] Plausibly, Umbdenstock's teaching ensured that younger Génie officers were more open to dispersed fortification. A conversation of *Le Matin* editor, Stéphane Lauzanne, with engineers on a construction site, provides circumstantial confirmation of that: the works were said to reject standardisation in favour of 'French craftsmanship', supposedly endorsed by Vauban: 'each casement has its own plan and arrangement: it's not mass production; it's magnificent and ingenious individual work'.[39]

Fourthly, military engineers were aware that German fortifications, which fell into French hands with the recovery of Alsace-Lorraine, anticipated the *ouvrage palmé*. The 'Feste' of the Moselstellung at Thionville combined traditional monoliths with dispersed combat positions within a wide perimeter, often surrounded only by barbed wire.[40] Pétain approved the Feste model, so long as

36 Camille Mauclair, *La crise du panbétonnisme intégral. l'architecture va-t-elle mourir?* (Paris, 1933), p. 20, 93.

37 Gustave Umbdenstock, *Cours d'architecture* (Paris, 1930), pp. 57–117; Gérard Monnier, *L'architecture en France: Une histoire critique (1918-1950)*. (Paris, 1990), 345; Romy Golan, *Modernity and Nostalgia: Art and Politics in France between the Wars* (New Haven, Mass, 1995), pp. 41, 155.

38 André Metz, 'Gustave Umbdenstock. Membre de l'Institut,' *Revue du génie militaire* 75 (1936), pp. 593–616.

39 Stéphane Lauzanne, 'Comment la France est-elle aujourd'hui défendu?,' Le Matin, 15 October 1930 and 'Ce que disait André Maginot de la Ligne,' *Le Matin*, 14 September 1939.

40 Quentin Hughes, *Military Architecture* (London, 1974), 225–30; Robert Varoqui, 'L'évolu-

French works were more dispersed and provided with underground galleries and barracks in the rear, which the Moselstellung lacked.[41] Before 1931, when he retired as head of the army, Pétain intervened to impose his preferences for individual plans. The CORF admitted resemblance to the Feste, except that French forts supported each other with flanking fire rather than firing frontally, thus protecting embrasures.[42]

Finally, the engineers who constructed the ouvrages had some latitude. The CORF's directions for siting were vague, for it initially relied on outdated 1:25,000 German maps of Alsace-Lorraine. Normand stated that the precise form would emerge through 'action', and before his premature death in March 1929, he privately pressed for dispersed forms wherever possible.[43] At Hochwald, the CORF's initial proposal for a centralised fort on the Hochwald crest, was abandoned first for two half-forts at the foot of the hill with a redoubt at the summit. Génie Lieutenant Robert Brice, who had served at the Hochwald since 1930 (with an interlude for training at the École d'Application), attributed the subsequent break-up of the two half-forts into a dispersed *ouvrage* to 'technical and financial reasons'. He describes toing and froing between the local Génie, topographical surveyors and draughtsmen. Brice, who had begun as a reserve officer, was far removed from the Polytechnique elite. The CORF never globally approved this evolution, but it issued dozens of notices.[44]

Architectural eclecticism

The ultimate form of the forts combined neoclassical and modernist trends with dispersal and sensitivity to the terrain in a whole that is not reducible to past forms. Underground, the separation of living from fighting blocs reflected the lessons of Verdun and modern urbanists' desire to enhance efficiency and well-

tion des formes techniques de la fortification française,' in *De l'oppidum à l'enfouissement: l'art de la fortification à Verdun et sur les marches de l'Est,* ed. Guy Pedroncini and Pierre X. Stroh (Verdun, 1996), 241–42.

41 P-V CDF, 11 October 1927, 1N52/6, SHD.

42 CORF, 'Note…' 24 May 1928, 1N53/1/1, SHD.

43 Rapport Normand, 31 July 1928 and 'Suite à note', 6 August 1928, 7 N 3781/1/10 & 11, SHD.

44 Colonel Robert Brice, *L'ensemble fortifié du Hochwald* (Self-publication, 1988), 14–15.

being through spatial segregation. Fillonneau told the CSG that although troops would not be provided with 'modern comfort' (that implied softness), fortification must be 'habitable'. In response, Pétain recalled the sickening conditions at Verdun.[45] Military engineers agreed that the garrison must live in healthy conditions, segregated from work spaces, with all the commodities indispensable for prolonged occupation.[46] Elevators, air conditioning and electric ovens well were installed in the Maginot Line well before they appeared in French homes.

In a sense, the forts resembled upside-down versions of the skyscrapers of Le Corbusier's imagined Paris, for they situated residential spaces in a small surface area, connected by rapid transport to combat blocs. Narrow-gauge electric trains were nicknamed the 'métro' and maintained by Paris métro workers serving as reservists. In the novel, *Double Crime sur la Ligne Maginot*, a fictional fort is 'an immense modern subterranean town … buzzing with ordered activity, methodically, minutely regulated, without useless effort and undue haste'.[47] The fort was the antithesis of the horrors of Verdun and of the disordered real cities of the 1930s, to which urban planning was the antidote.

Modernism was evident too in furniture design. In working-class housing, folding metal furniture saved space in tiny apartments, thus permitting higher-density occupation and rescuing the maximum number of workers from slums. In the restricted spaces of the *ouvrages*, engineers stipulated that furniture should be reduced to a minimum, movable, and foldable.[48] Soldiers slept in triple-tier, metal-framed bunks, occupied in turn by each of three 'watches' – the equivalent of factory shifts.

The entrances for men and munitions were the most visible installations (Figure 4). They possessed the clean horizontal lines and pure forms of classical and modern buildings – of course without the ribbon windows and non-load-bearing facades of the avant garde. Although the impression is of mass rather than the modernist volume and airiness, lack of embellishment was an aesthetic

45 PV CSG 12 October 1927, 1/N/29/4, SHD.

46 Colonel breveté Didio, 'Note Au Sujet de La Fortification Permanente,' *Revue Du Génie Militaire*, 73 (1934), 5–42: at 33-4.

47 Pierre Nord, *Double Crime Sur La Ligne Maginot* (Paris, 1936), pp. 217.

48 Didio, 'Note,' 33–34; Christopher Wilk, 'Sitting on Air,' in *Modernism, 1914-1939: Designing a New World*, ed. Christopher Wilk (London, 2006), pp. 225-48.

choice, for decoration was possible. One officer, who regretted the uniformity of the entrances, suggested placing the motto 'honneur et patrie' there.[49]

Whatever their genre, entrance blocs projected power and command. Photographed in mid distance, even when painted with camouflage designs, they dominated human beings. Troops marched ceremonially into them, recalling the symbolic entry of sovereign princes through the gates of fortress towns. The movie, *Double Crime sur la Ligne Maginot*, for which the army provided a battalion of infantry and band, begins and ends with ceremonial entrances and exits from the fort.[50] During the phoney war, foreign dignitaries were photographed ceremonially outside the entrances. Fortification troops regularly paraded through towns in which autonomism was strong.

At least one modernist architect saw the fortifications as interesting. In early 1939, Pierre Vago, editor of the iconic modernist review, *L'Architecture d'Aujourd'hui*, asked permission to visit a fort to collect material for an article on 'military architecture'. An antisemitic intelligence officer responded that Vago's being a scheming polyglot Israelite' should not detract from his international reputation and contribution to cultural progress. The officer advocated profiting from the opportunity to publicise the Génie's achievements.[51] Other visitors detected a combination of neoclassicism with the romantic regionalism of the 1930s. Although that perspective tells us much about the eye of the beholder, it was not entirely without foundation, for in response to criticism and in quest of contracts, modernists did, in the early 1930s, embrace regional variation. Two followers of Charles Maurras – a neo-monarchist who saw France as the heir of the classical authority principle, were more open to romanticism than their master. The science writer, Pierre Devaux saw a modern version of classical fortification, but also buried cathedrals of Breton myth and medieval fortified chateaux, buried to the tips of their towers.[52] Robert Brasillach, a Nazi sympathiser mobilised in 1939, reported arriving at 'high gates in the Mycenaean or

49 Etat-Major des Armées Inspection, 20-21 February 1936, 7/N/3770/4, SHD.

50 Gandéra to War Minister, Fonds Moscou 199404963/3/83 Archives nationales, Paris; Gandéra to War Minister, 7 April 1937, 7/N/570 supplément, SHD.

51 2e Bureau-SCR, 'Note très confidentielle', undated, ?May 1939, 7NN2527/1, SHD.

52 Pierre Devaux, 'De Vauban à la Ligne Maginot,' *Gringoire,* 26 October 1939.

Figure 4 : The munitions entrance at Gros Ouvrage Schoenenberg.
Contemporary photograph, Author.

National Socialist style popularised in film and image'.[53]

A communist journalist described the CORF Rhine casemates semi-ironically as covered with brush, beautiful blockhouses with veranda, green shutters, nice whitewash, the whole fenced off, but with barbed wire, and with the signs 'entrance and photography forbidden—military terrain'.[54] Ordinary soldiers, in an effort to render the austere *ouvrages* more agreeable, softened entrances to *ouvrages* and blockhouses with the suburban rural look, dug vegetable plots and kept livestock. The novelist, Henry de Montherlant, saw the habit of decorating the entrances to *ouvrages* with flowerpots like 'villas' in a Parisian suburb as 'typical embourgeoisement of tragedy by the French'.[55] Doubtless Montherlant would have hated the regionalist aesthetic of the security camps, constructed near the *ouvrages.*

53 Robert Brasillach, *Notre Avant Guerre* (Plon, 1941), 299–300.

54 *L'Humanité d'Alsace-Lorraine*, 1 January 1933 ; see also *Le Matin*, 8 April 1936; *L'Intransigeante*, 3 June 1938.

55 Henry de Montherlant, *L'equinoxe de septembre* (Paris, 1938), 92–93 Montherlant wrote in the context of his opposition to Appeasement.

The security barracks

From 1933, the army built thirty-one such 'casernements de sûreté' in the East and more in the Southeast. Existing barracks were notoriously dilapidated and too far from the *ouvrages* to permit instant response to a surprise German attack. The new camps were a cross between Vauban's planned fortified towns, company towns, and suburban *cités-jardins*. A journalist described them as 'warrior cities'; they were strongpoints, surrounded by barbed wire and studded with gun emplacements and bomb shelters. Wives and children were provided with gas masks.[56] Officers explicitly likened zones within them to the segregation of engineers and workers in company towns.[57] The camps were divided into a *cité-jardin* with individual homes, apartment blocks and flats for officers and NCOs, depending on their marital status, and barracks for troops.

The cités-jardins

Although in 1937, a special edition of *L'Architecture d'Aujourd'hui* showed that some officers favoured modernist high-rise residential buildings, there was never any question of constructing them in these camps.[58] In 1928, the aforementioned circular on military architecture rejected them in favour of low-rise garden cities.[59] In 1936, Camille Rougeron, a Polytechnique-trained naval engineer, published an article claiming that rural garden-cities dispersed in the provinces were better able to resist bombardment than skyscrapers (as General Vauthier, a specialist in air defence, had claimed). He dismissed modernist buildings for becoming 'passé between two art déco exhibitions'. He proposed individual dwellings in two-hectare plots, with vegetable patches and bomb shelters, the latter as necessary as 'dispersed machine guns under concrete in the East' (the Maginot Line).[60]

56 6e Région, 'Rapport,' 24 February 1936, 7/N/3770/8, SHD.

57 General Cousse, 'Rapport,' 23 December 1935, 7/N/4037/1, SHD.

58 Pierre Vago, 'Défense Passive,' *L'Architecture d'aujourd'hui*, 8:12 (1937), pp. 2–33.

59 'Circulaire ministérielle,' 10 July 1928, *Revue du genie militaire*, 63 (1928), 371-2.

60 Camille Rougeron, 'Le bombardement des immeubles d'habitation,' *Revue de l'armée de l'air* 8, no. 83 (1936), pp. 661–74; Efi Markou, 'Militaires et urbanistes durant les années

When Rougeron wrote, modern regionalist-style *cité-jardins* were already under construction on the Maginot Line. They were considered appropriate for the technically trained officers and NCOs who manned the fortifications. Like civilian managers and supervisory personnel who resided in city suburbs, officers and NCOs expected a bourgeois or petty-bourgeois career, agreeable social and cultural lives, schools for their children and homes segregated from those of other ranks. Pétain considered that 'promiscuous' existing camps undermined officers' prestige. However, his proposal to disperse officers in new homes in local villages was rejected, for officers saw locals too as beneath them.[61] In 1936, Daladier, war minister in a new socialist-led government, promised that cadres' service in the fortifications would be reconciled with the 'obligations of family life' and that for all troops great attention would be paid to hygiene, lodgings, food, sports and distractions.[62]

Houses and apartment buildings conformed to modern-regionalist styles. Standard plans were used for each camp, but varied according to the taste and imagination of the Génie officers who designed them – some had doubtless attended Umbdenstock's lectures, while some reserve officers had civilian building experience. Construction was permitted in either brick and mortar or steel frame with concrete filling. The latter was preferable, for it was cheaper and more fire-proof.[63] Buildings usually referenced local styles, albeit insufficiently for those regionalists purists who saw the term 'cité-jardin' as synonymous with 'interchangeability', modern mediocrity, and suburban pretentiousness.[64] Officers did worry that fortification service bourgeoisified them.[65] A colonel remarked that the uniformity and alignment of houses at Oermingen camp resembled too closely a barracks or workers' cottage [*coron*]. The camp is now a prison.[66]

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trente : L'aménagement urbain et la menace aérienne,' *Les Annales de la Recherche Urbaine*, 91:1 (2001), pp. 18–26.

61 Pétain, 'Visite des RFs du Nord-Est,' 13 August 1935, 7/N/3770/2, SHD.

62 'Instruction provisoire sur le service dans les ouvrages,' 7 October 1937, 7/N/3781/2, SHD.

63 Lieutentant-Colonel Henry Dutailly, 'L'architecture Militaire,' in *Histoire Militaire de La France*, 3. De 1871 à 1940, ed. Guy Pedroncini (Paris, 1992), pp. 364–65.

64 Jean-Claude Vigato, *L'Architecture Régionaliste - France 1890-1950* (Paris, 1994), 204.

65 Kevin Passmore, *The Maginot Line: A New History* (London, 2025), 146–47.

66 Lt-Colonel Reyx, Rapport, 10 December 1938, 7/N/4040/2, SHD.

The Elzange *cité-jardin*, situated on the territory of Elzange and Koenigsmacker communes, was less anonymous. It possessed lawns, trees, allotments, tennis courts, schools, dispensaries, private garages, and stables.[67] With the exception of the entrance buildings, which epitomised the 'horizontal effects' that Umbdenstock deplored, its structures referenced the Lorraine, but precisely how is difficult to say. It was hard anywhere to define a single regional style given the arbitrariness of borders, fine-grain local variations and borrowings from elsewhere. It was especially difficult to characterise an authentic Lorraine, given that for fifty years the region had been divided between France and Germany and that the annexed part (the Moselle department) was divided between Francophone, Germanophone, agricultural, mining, and steel-producing zones. In fact, the buildings betrayed the authorities' desire to homogenise regional styles and demonstrate the subordination of the *petite patrie* to the *grande patrie.* This agenda was clear at the 1937 International Exhibition in Paris. To show the unity of the province, the Lorraine pavilion oddly combined Latin Romanesque and Germanic styles, while the new neoclassical Palais Chaillot dominated the exhibition site as a whole. [68]

The Elzange houses and apartment blocks epitomised this modern regionalism rather than Umbdenstock's 'authentic' buildings (Figure 5). They were constructed industrially, with brick or steel frames and brick filling faced with render, with structurally superfluous regional touches. Although steep hip roofs allowed snow to slide off, they used flat industrial tiles, not the traditional rounded *tuile canal*. Arches on the facades evoked the barns typically incorporated into terraced farmhouses in Lorraine villages. The steps were common in wine-growing villages, where habitations were built over cellars – this form was part of the Lorraine pavilion in the Paris exhibition. Elzange houses contrasted with the poverty of Lorraine villages, in which manure was piled outside houses.

67 Plans, 29/J/3 and /4, Archives départmentales de la Moselle, Metz; Truttmann and Lisch, *La muraille de France*, 309–11.

68 Correspondence, 1936-7, F12/12410, Archives nationales; Shanny Peer, *France on Display: Peasants, Provincials, and Folklore in the 1937 Paris World's Fair*, (Albany NY, 1998), 150; James D. Herbert, 'The View of the Trocadéro: The Real Subject of the Exposition Internationale, Paris, 1937,' *Assemblage*, 26 (1995), pp. 95–112.

Figure 5 : Officers homes at the Elzange Cité des Officiers

Interiors did not conform to the Lorraine pattern of three rooms leading successively from one side of a corridor perpendicular to the street, with a kitchen as the second room. Each floor was divided into equal square rooms corresponding with the steel frame, with no attempt to use the freedom of steel-frame construction. Officers' houses used the conventional bourgeois division of downstairs entrance, lounge, dining-room, kitchen, WC; upstairs, three bedrooms, an attic room for maid or orderly.[69]

Married under-officers occupied smaller semi-detached two-story houses or single-floor apartments. Following the principle of respectability – Vauban's 'convenance' – the exteriors were less elaborate than those of officers' houses, for there were no arches.[70] They were a transition

69 Jacques Mercier, www.maginot.org/elzange, 2008-9.

70 Perreon, 'Les fortifications de Vauban,' 30.

towards the simpler neoclassical forms of the barracks.

The barracks

New camps offered a chance to improve conditions for conscripts, for dilapidated existing barracks fed criticism of the army. General Condé (a commander on the Maginot Line) wrote that 'streets, cafés, factories, and shops glimmering with light' in modern cities contrasted painfully with the 'dark hole of the barrack's, which 'threw the men into the streets, to shady bars of ill-repute where they meet professional antimilitarists' – that is, into the dark underbelly of the modern city.[71] Pétain told parliament that 'we require pleasantly equipped barracks so that the security troops can live comfortably'.[72]

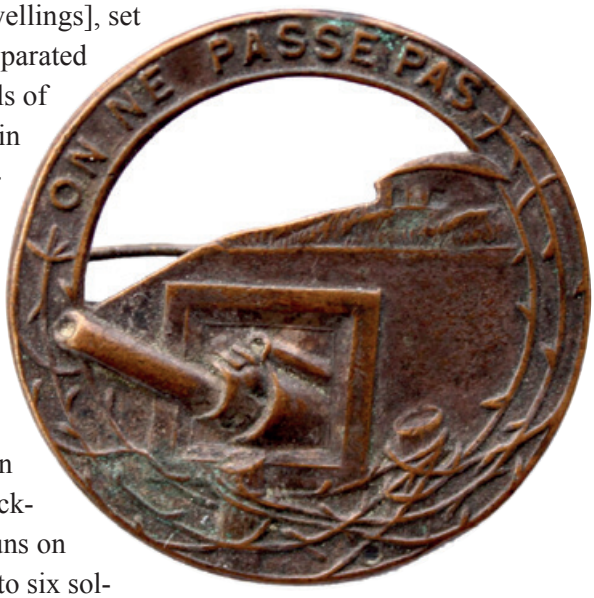
The new barracks stuck to the traditional dormitory layout. Whereas only the most radical modernist architects advocated collective living, the army never doubted its necessity. It was deemed even more essential in the Maginot Line, for unforeseen dispersal of troops in small blockhouses had to be countered by grouping soldiers under commanders' eyes.[73] Nevertheless, as modernists advocated, industrial construction allowed greater efficiency and comfort. Kitchens and refectories were under the same roof to solve the notorious problem of cold food. The troops possessed games and relaxation rooms with bars. Photographs show that at Elzange, rural and desert landscapes in false arches on the walls of these rooms reminded troops of their duty to defend the frontier and that their fort was part of an imperial defence system. They were painted in the 'organised landscape' style – the most popular genre of the interwar years.

The Elzange exteriors positioned them within the simple, neoclassical tradition of military installations. There was just enough ornamentation, similar to that of the officers' houses, to locate them regionally, and situate them as subordinates within the army and state. In the camp as a whole the ambiance was of clean lines, rationality, and health. A sapper described Légeret camp as 'modern and less austere than those I've seen hitherto'; the barracks resembled

71 Condé to Ministre, 17 January 1935, 7N4040/1, SHD.

72 *Journal Officiel*. *Débats Chambre*, 14 June 1934, p. 1496. In *La France militaire*, 12 January 1929.

73 'Logements militaires', *La France militaire*, 12 January 1929, and 'Garnisons de Sûreté,'15 December 1932.



well equipped 'pavillons' [suburban dwellings], set in a park enclosed by a low wall, not separated from civilian life as were the 'high walls of our old prisons'.[74] Another soldier saw in the 'ultramodern' Saint-Jean-les-Marville camp in the Meuse department 'a certain luminosity with spaces for life, leisure, study or sport, with all-arms firing ranges close by'.[75]

The rustic aesthetic was curiously visible in the fortified houses (maisons fortes) which served as warning posts in advance of the fortifications. These blockhouses housed antitank and machine guns on the ground floor and lodgings for three to six soldiers above.[76] Those on the Ardennes front doubled as guard posts and their raisable barriers made their function obvious.[77]

Those in advance of the Lauter fortified region in Lower Alsace were often disguised as residential buildings. A sapper described them as 'fortified *ouvrages* capped with maisonettes'. He marvelled at their telephones, running water, and electricity.[78]

Conclusion

From an architectural perspective, the Maginot Line was an eclectic blend of neoclassicism and modernism, neither of which were entirely immune from sensitivity to regional variation, and with modernism. But the objective of this

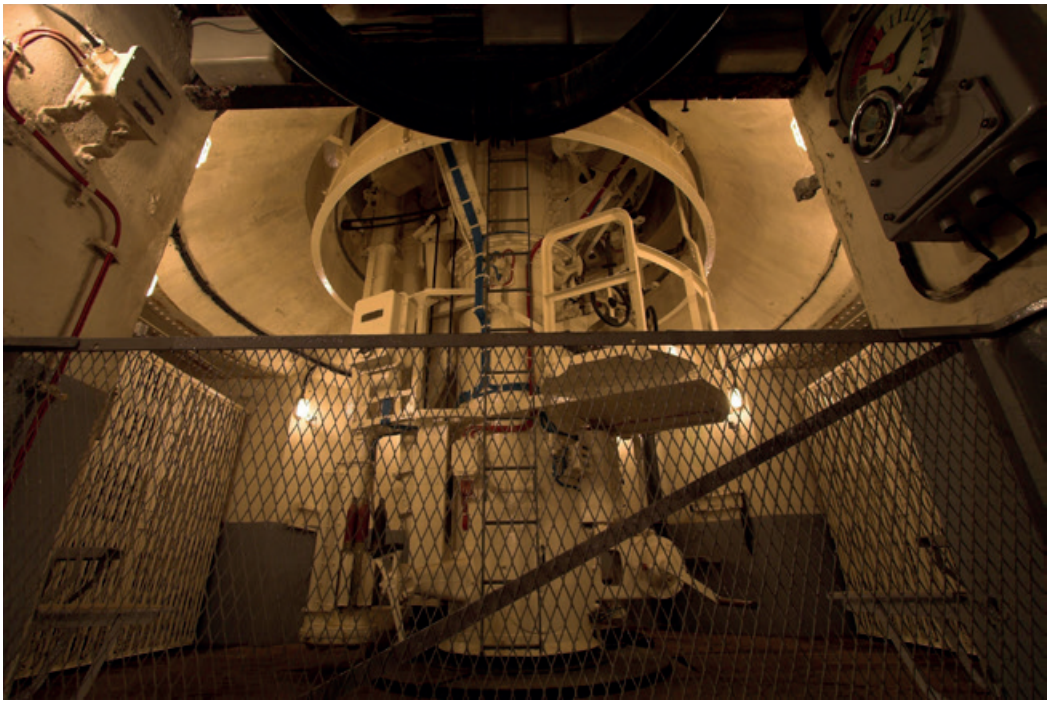
74 Léon Noguéro, *Soldat en Alsace-Lorraine, 1939-1940*, ed. Henri Noguéro (Lyon, 2017), p. 62, 5 November 1939.

75 Léon Rodier, 'Un témoignage sur la Ligne Maginot 1937-1940,' in *De l'oppidum à l'enfouissement*, p. 293.

76 'Notice technique,' 11 March 1935, 7/N 3775/2, SHD; 20th Region, Note, 26 October 1937, 33N96/1, SHD.

77 20e Région, 'Note de service,' April 16 1937, 33N96/1, SHD.

78 Noguéro, *Soldat en Alsace-Lorraine, 1939-1940*, 54, 25 October 1939.



Fort Shoenenbourg (Alsace). Photo ignis 2006 CC BY-SA 3.0.
Wikimedia Commons

article is not simply to categorise the 'influences' on the aesthetic of the fortifications. It has asked what was at stake in the use of particular aesthetics, and how, through conflict and negotiation of technical challenges during planning and construction, the fortifications became something aesthetically new, which nobody had entirely intended or foreseen. They were a symbol of state power, constructed in a region with a long history of using military and civil architecture to express state power, from Vauban's forts to Strasbourg and Metz railway stations and the Palais du Gouverneur in Metz, constructed under the German annexation. However, as it was constructed, officers with different conceptions of the art of war contested the engineers' hubristic plans. Then, the troops who occupied them humanised with the fashionable rural aesthetic, thus accentuating their eclecticism. The Maginot Line was made from below as well as from above`.

The role of air power in siegecraft: The experience on the German Soviet Front in World War Two

by Giorgio Scotoni

From June 22, 1941 siegecraft was a standard tactic of the blitzkrieg "Barbarossa".

First was the Brest fortress where besieged soldiers resisted with stoic valour. The garrison became a symbol for Soviet propaganda which represented the conflict as a 'defensive, patriotic war'. On September 8, German and Finnish troops finalized the blockade of Leningrad, lasting 872 days. On October 19, the State Committee of Defence (GKO) proclaimed Moscow under state of siege. From October 30, 1941 to July 4, 1942 the stronghold of Sevastopol resisted the siege for 250 days. The Red Army got its revenge at the end of 1942 in Stalingrad where General Chuikov turned the German siege of the 62nd Army into a pocket for the 6th Army of General Paulus.

This paper seeks to analyse a neglected factor in Soviet military historiography: the efficacy of airpower in siege activities at these strategic sites. It investigates both the tactics of Soviet forces encircled in the besieged cities as well as the policies of civil resilience through which the internal front supported defence of the key centres. I focus on the topic from the Russian perspective following a chronological approach.

Official periodization separates the so-called "Great Patriotic war" into three phases: June 22, 1941 - November 18, 1942; November 19, 1942 - December 31, 1943; January 1, 1943- May 9, 1945. The first period of the war on the Eastern Front offers the framework to critically explore the evolution in the employment of air power in an offensive or proactive way (to hit the site under siege), such as in Leningrad and Moscow, as well as in a defensive or reactive way (to

support the site under siege) notably the German forces encircled at Demjansk and Stalingrad

The lesson taught by these sieges confirms that air dominance wasn't an unequivocally decisive factor with regard to both the proactive and reactive orientations.

Even when *Luftwaffe* gained air superiority and full capability to conduct ground-attacks, this advantage didn't on its own lead to the fall of the sites under siege. In the clashes where the Red Army linked its position to metropolis or fortified cities the ability to carry out air strikes doesn't appear to be the main driver of Axis success.

A rapid campaign to crush Soviet Russia

At 4 a.m. of Sunday June 22, 1941 the Axis opened the major operation of the second World War, codenamed "Barbarossa". Overall, the *Wehrmacht* fielded on the Eastern Front 70% of its troops, 75% of its artillery and 90% of its tanks.

The invasion force, almost 5 million men, attacked along 4,000 kilometres from Murmansk to Odessa structured in three colossal Army Groups: 'North', moving forward Leningrad; 'Centre' moving forward Moscow; 'South', moving forward Kiev. Each Army Group included millions of soldiers and thousands of advanced combat aircraft, bombers, and fighters.

The *Luftflotte 1* (Air Fleet 1, Gen. Alfred Keller) with its 1070 aircraft served within the Army Group 'North' - 29 divisions including the 4th Tank Army - supporting the advance across the Baltic. The *Luftflotte 2* (Air Fleet 2, Gen. Albert Kesselring) with its 1680 aircraft served within the Army Group 'Centre' - 50 divisions including the 2nd Tank Army and the 3rd Tank Army – fighting in the direction of Moscow. The *Luftflotte 4* (Air Fleet 4, Gen. Alexander Löhr) with its 800 German aircraft and 500 airplanes of the Rumanian Air Force served within the Army Group 'South' - about 57 divisions including the 1st Tank Army - assisting the penetration throughout Ukraine.

The plan was to destroy the bulk of the Red army in the initial attack, to then rapidly penetrate into European Russia and conquer the three main targets. The blitzkrieg was supposed to conclude by winter 1941, occupying the whole terri-

tory to the "Line A-A" (Archangel'sk-Gor'kij-Astrakhan'): "The final objective of the operation is to erect a barrier against Asiatic Russia on the general line Volga-Archangel"[1].

Soviet air power was neutralized in the opening week of campaign.

The Red army had one of the largest air forces, totalling more than 7000 combat aircraft in the Western military districts. Thanks to the surprise attack in 24 hours the *Luftwaffe* destroyed 1811 Soviet aircraft (1489 on the ground, 322 in aerial combat).

The Axis gained a massive air power advantage and wiped out the opposing forces, bombing hundreds of airfields. In a few weeks the joint air power of the German, Finnish, Hungarian, Italian, Rumanian, and Slovak air forces was able to establish full control of the sky. Over the occupied territory and far beyond it, Soviet towns and lines of communication - roadways, railways, logistic mechanisms ensuring food supply and support from the rear were vulnerable to air strikes and bombing operations.

After having annihilated the Soviet forces along the frontier the Army Groups were to continue advancing in three directions: the 'North' towards the old Russian capital, the 'Centre' towards Moscow and the 'South' towards the capital of Ukraine, Kiev.

At the beginning of "Barbarossa" the Soviet High Command (*Stavka*) meant to fight a positional and attritional warfare. This strategy relied on buying time. The order was all-out resistance: hold encircled positions to the last man standing, to allow the *Stavka* reorganize the forces and evacuate the factories to the East.

Soviet forces under siege, like the Brest garrison, or encircled in positions linked to cities adopted tactics of defensive attrition. A textbook case was Smolensk, to be referred to as a battle. In the city, named 'the door to Moscow' the surrounded troops stopped for two months the advance toward the capital inflicting massive losses on the *Wehrmacht*. Due to this Hitler changed the plan.

1 Führer and Supreme Commander of the Armed Forces: *Directive No. 21.'Case Barbarossa'*, 18th December 1940. From: Trevor-Roper H.R. *Hitler's war directives 1939-1945* Londra, Sidgwick & Jackson Ltd. 1964.

Now the goal was at first to conquer Leningrad and Kiev and then to launch the final attack on Moscow.

However, while the attackers took a maneuverist-annihilating strategy, which forced the Red Army to fight fragmented mobile battles, the *Stavka* wasn't able to stabilize a cohesive frontline, and this gave way for the Axis forces to advance deep into Soviet territory.

The attackers inflicted stunning defeats on the Soviet forces and killed or captured an enormous number of soldiers. In just the first six months the Red army lost 3,671,600 troops, 20,500 tanks and 159,000 trucks.

The Soviet air defence system during the first period of the "Great Patriotic war" was reshaped to cover single, strategic sites. From the first week the most advanced air units and anti-aircraft assets were deployed to protect the main political and industrial centres, namely Leningrad, Moscow, and Baku, the major hub of the Soviet oil industry. To defend these three sites the Red army deployed there 42% of its medium calibre anti-aircraft artillery and to 50% of all its fighter squadrons.[2]

At the opening of the autumn-winter campaign of 1941 the largest concentration of air defence resources was maintained around Moscow and Leningrad with more than 700 fighters strengthened by 1800 anti-aircraft systems.[3] In July 585 fighters, 1000 small and medium calibre anti-aircraft guns, 336 anti-aircraft machine guns, 618 searchlights and hundreds of barrage balloons covered the sky of the Soviet capital.

Leningrad

The former Petersburg was part of the Northern Air Defence Zone (Gen. F. Ja. Krjukov) and its defence was provided by the 2nd Air Defense Corps and the 7th Fighter Aviation Corps with up to 305 fighters. In addition the *Stavka* deployed 6 anti-aircraft artillery regiments, the 2nd Anti-Aircraft Machine Gun Regiment.

2 *Vojska PVO strany v VelikojOtechestvennoj vojne 1941- 1945: kratkaja khronika*. Moscow, Voenizdat, 1981

3 Id. p.6

The air defence assets included 800 small and medium calibre anti-aircraft guns, 141 anti-aircraft machine guns, barrage balloons and 438 searchlights. High Command considered the air□raid shelters primary means of protection against bombing. They had been prepared before the invasion began and by the 31st of August there were 4,600 shelters in the former Russian capital. Most of them were located in basements and they could in total accommodate about 800,000 people, i.e. only one third of the citizens.

The immediate response of the Northern Air Defence forces to the Axis attack was active defence. On June 25, the aircraft of the Soviet Northern Front, of the Baltic and Northern fleets (263 bombers and 224 fighters) hit Finland in a large-scale strike targeting 19 air bases and destroying hundreds of aircraft and infrastructure.

According to plan "Barbarossa" the Army Group "North", operating in the general direction of Leningrad, had to destroy the Soviet forces in the Baltic area.

This essential task included the occupation of Leningrad and Kronstadt naval base, and was to be fulfilled simultaneously with the attacks of Army Groups "Centre" in the direction of Moscow and "South" towards Ukraine and the Caucasus.

But, at the end of July 1941, the heavy losses suffered in the Battle of Smolensk suggested a change of strategy to the Supreme Commander of the Armed Forces.

Amid strife with the Commander-in-Chief of the Army, von Brauchitsch, who was focused on Moscow, the Führer decided to postpone the advance in the direction of the Soviet capital further. Inspecting the headquarters of Army Group "North" he stressed that with the capture of the "cradle of the Bolshevism" the USSR would lose one of the symbols of the revolution, which had been the most important to the Russian people over the past 24 years, and that the fall of Leningrad could lead to the complete collapse of the Soviet Union.[4]

On the 30th of July (Directive No. 34) Hitler postponed the capture of Moscow and prioritized the encircling of Leningrad in junction with the Finnish

4 Stemenko S.M. "General'ny shtab v gody voiny" (*The High Staff in the war's years*) Moscow, Voennizdat 1989.

Army. The choice was motivated by the symbolic status of the city and the strategic importance of Kronstadt, the main base of the Soviet Baltic Fleet.

In mid-August the Führer ordered Army Group "Centre" to take a defensive stance and reinforce the *Luftflotte 1* of Army Group "North" with the *Fliegerkorps VIII* of gen. Richthofen. A supplement to the Directive No. 34 detailed: "Before the beginning of this attack on Moscow operations against Leningrad must be concluded and the aircraft from 2nd Air Fleet which are at present attached to 1st Air Fleet must again be available to 2nd Air Fleet (…) With regard to co-operation by the Air Force, it should be a principle, as far as the position of our own airfields allows, always, if possible, to concentrate on a single point, in order to secure the utmost effect."[5]

The *Luftwaffe* had carried out air-raids on Leningrad since June 26, but the first massive bombing was on September 6. Civilian casualties were significant: 304 people killed, and 3,854 wounded. That day Stalin sent the Chief of the General Staff, Gen. Zhukov, from Moscow to Leningrad to supervise the defence of the city.

Indeed, this air strike on the front over Leningrad was followed by the final assault of the German 18th Army from the south which attacked in conjunction with the Finnish Corps from the north. As Hitler ordered the goal was to surround the Soviet troops of the 54th Army encircling Leningrad by the 15th of September: "Before this (…) should weather permit, a large-scale air attack on Leningrad will be carried out. It is particularly important in this connection to destroy the water supply."[6]

On 8 September the 1st Air Fleet and the 8th Air Corps launched a double air raid: 6,327 incendiaries were dropped destroying the central warehouses with 3,000 tons of flour, the main water pumping station, the railway station to Moscow and hitting hundreds of buildings. The bombing achieved a twofold task: to identify weaknesses in the city's air defence system uncovering the layout of the anti-aircraft batteries and to open breaches into Soviet lines. Thanks to air sup-

5 The High Command of the Armed Forces. *Supplement to Directive 34* 12th August 1941. From: Trevor-Roper H.R. *Hitler's war directives 1939-1945* Londra, Sidgwick & Jackson Ltd. 1964.

6 The Führer and Supreme Commander of the Armed Forces. *Directive No. 35*, 6th September 1941. Id

port the German troops penetrated to Schlüsselburg, took the town and cut off the last link connecting the city with the interior. So, on the same day Leningrad was blockaded by the Axis's forces.

Then, the *Luftwaffe* launched new raids on the warehouses and the shipyard. The air attacks on September 19 and 27 had devastating effects. The first one was the heaviest air-strike Leningrad suffered during the three years of siege. Six raids occurred that day. Five hospitals were hit in the bombings, as was the largest shopping mall and the Mariinsky Theatre. The casualties were over 1,000 and many of those killed were wounded soldiers in the hospitals. It's worth noting that the Finnish air force did not carry out air-raids on the city centre yet.

Meanwhile the Kronstadt naval base and the ships of the Baltic Fleet suffered a series of large-scale air strikes. The first air raid (September 21) involved 220–230 German bombers, including Ju 88s and Ju 87 dive bombers. In the second raid (September 22), 160–180 bombers took part. In the third major raid (September 23), 140–160 bombers struck a range of naval targets. Overall, German aircraft sunk five large military vessels, one submarine and damaged dozen other ships.

The Red army however prevented the planned capture of Leningrad. Under Zhukov's supervision the German Army was stopped in the suburbs. By committing its last resources, on September 25 the Soviet 54th Army stalled the Axis' advance.

As the *Wehrmacht* closed the ring around Leningrad reaching the shores of Lake Ladoga the Nazi leadership gave up on taking the city by storm. In response to the German Navy asking to preserve the shipyards and port infrastructure for its own use, the Führer declared that Leningrad was to be reduced to rubble by artillery fire and air strikes, starving to death its three million inhabitants.

On September 22, the infamous order "On the future of Leningrad"[7] stated:

> "The Führer has decided to wipe the city of St Petersburg off the face of the earth. Following the defeat of Soviet Russia, the continued existence of this major settlement is of no interest whatsoever (...) 3. The

7 Directive No. L-a 1601 of the Chief of the Naval Staff, "Die Zukunft der Stadt Petersburg", September 22, 1941.

> Navy's previous requests regarding the preservation of shipbuilding, port and other facilities of importance to the Navy are known to the Supreme Commander-in-Chief; however, it is impossible to comply with them in view of the general policy adopted with regard to St Petersburg. 4. It is intended to encircle the city in a tight ring and, by means of artillery fire of all calibres and continuous aerial bombardment, to raze it to the ground. If, as a result of the situation that has arisen in the city, requests for surrender are made, they will be rejected, as the problems associated with the presence of population in the city and its food supply cannot and must not be resolved by us"[8]

After dismissing the idea of taking the metropolis the ground offensive stopped.

The *Luftwaffe* returned the 8th Air Corps to the 2nd Air Fleet Air Fleet while the 1st Air Fleet continued to bomb the city daily until the end of 1941. The casualties were heavy. According to Soviet data, in November, 1,382 people were killed and 8,301 wounded by air-strikes.

From September 8 to December 31, 1941, German aircraft dropped a total of 3,509 high-explosive bombs and over 66,000 incendiary bombs on the city. In addition, the *Wehrmacht*'s long-range artillery fired more than 13,000 shells of all calibers at the "Bolshevik stronghold." As a result of air raids and artillery shelling, 2,325 houses, 673 public and industrial buildings, and 22 bridges were destroyed. A total of 4,483 people were killed, and 15,543 were wounded.

Leningrad had neither modern fortified positions, like in Sevastopol, nor robust coastal defences. Furthermore, on the Soviet side it was difficult to reinforce the Leningrad Front during the winter and the lack of essential resources in the city made resistance an "open question".

While the Red army's units encircled in the city's inner perimeter adopted tactics of defensive attrition the internal front supported strategic defence.

Since August the Leningrad Military Committee provided the partial evacuation of the three million inhabitants. Almost half of the pre-war population was evacuated from the city, in three waves: June–August 1941, 488,700 peo-

8 Id.

ple; September 1941–April 1942, 659,000 people; May–October 1942, 403,000 people.

From September 1941 to January 1943 the only escape route in the blockade was across Lake Ladoga. This connection initially was realized by boats and in the winter through the so-called 'Road of Life', an ice road which was built in November 1941. Truck routes across the ice granted relief to Leningrad - in December 1941 an average of 361 tons were brought in each day[9].

Food rationing had a big impact upon those who remained in the besieged city. The minimum bread ration was set in November–December 1941: 125 grams for civil servants, dependants and children; 250 grams for workers. During the long siege cold and hunger decimated the population.

Policies of civil resilience were a key to resist the blockade. Despite the famine and constant shelling, the inhabitants tried to continue their daily life.

Military industries, like the "Kirov Plant", a few km from the front line, remained in operation and cultural life never stopped. On the city radio and among the troops poets such as Olga Bergholz and Vera Inber gave recitals. Great composers like Boris Golts, dead in the blockade, and Dmitri Shostakovich played concerts. The 7th 'Leningrad' Symphony on which Shostakovich worked under siege is a musical monument to the resistance. Karl Eliasberg, conductor of the Leningrad Radio Symphony Orchestra formed from the musicians who survived, performed around 400 concerts on the radio and in town hall. On 9 August 1942 his orchestra performed the 7th Symphony in the besieged city, a concert that would be marked in history.

As a result of operation "Iskra" on 18 January 1943 the tight siege was broken. The blockade was completely lifted on 27 January 1944. Until the end of 1943 Leningrad was subjected to systematic artillery fire and bombing. Out of the 872 days of the siege, approximately 150,000 shells were fired and 107,000 bombs were dropped. The last shelling occurred on January 22, 1944. The total number of victims ranged from 630,000 residents (Soviet data presented at the Nuremberg Trials) to 800,000. Unsurprisingly only 3% of deaths were caused by artillery fire and air strikes. German shelling and bombing killed a total of

9 *Overy Richard, Russia's War*, London, Penguin books 2010, p. 111

5,723 and wounded 20,507 civilians[10]. The remaining 97% of people died from starvation, cold, and disease.

Moscow

After Hitler's decision to postpone the final assault on the Soviet capital the operation, codenamed 'Typhoon' began on 30 September 1941.

The *Wehrmacht* launched three out of four *Panzergruppe* and almost half of the fighting units operating in the USSR against the Soviet capital: 1.8 million men, 1,700 tanks, 14,000 guns and mortars, and 1,390 aircraft. They were opposed by three fronts (the Bryansk, Western, and Reserve Fronts) numbering 1.25 million men, 990 tanks, 7,600 guns and mortars, and 677 aircraft.

In the opening phase German forces attacked from two sides on a front of 700-1110 km trying to tightly encircle the city in a pincer movement. Having captured Bryansk by 6 October, the *Wehrmacht* on 7 October enveloped the main Soviet forces (23 infantry and 3 tank divisions) in the pocket of Vjazma.

The frontline was crushed and by 12 October the German troops advanced to the area surrounding Moscow, within the perimeter of the modern city.

On the very day the Führer ordered that "the surrender of Moscow must not be accepted, even if it is offered by the enemy."[11] Like for Leningrad, no German soldier was to enter in the capital. According to Hitler

> "Anyone who attempts to leave the town and pass through our positions is to be fired upon and driven back (...) as for other towns, the rule must apply that, prior to their capture, they should be devastated by artillery fire and air raids, and the population put to flight. It would be utterly irresponsible to risk the lives of German soldiers to save Russian cities from fire or to feed their populations at Germany's expense. The more of the population of Soviet cities that flees into the Russian interior, the greater the chaos in Russia will become, and the easier it will be to administer and utilise the occupied eastern regions."[12]

10 Gremanjuk, N.M.; Dmitrev. V.I.; Kornienko, A.I. *Dvazhdy Krasnoznamennyj Baltiskij Flot* Moscow, Voenizdat, *1990*

11 The High Command of the Land Forces (OKH) Directive "On the procedures for seizing Moscow and the treatment of its population" October 12, 1941

12 Id.

When on 15 October the reconnaissance units of the 4th Panzer Group reached the suburbs, Stalin ordered evacuation. The Soviet government and foreign diplomatic missions were to leave for Samara. However, half of Moscow's population (2.2 million people) and the State Committee of Defence (GKO) remained to defend the capital. The inhabitants and the militia members defended the capital digging kilometres of trenches and blocking the main streets with anti-tank barricades.

Aside from being the political capital, Moscow was a key industrial, logistic and command centre of USSR. Aware of the consequences of losing the strategic centre, on 19 October the GKO imposed a state of siege in Moscow. From then on, the life of a besieged city began: food rationing, work mobilization and punishment by a military tribunal of civilians who disrupted public order.

While German forces tried to close the encirclement ring the air raids on the capital intensified. The *Luftwaffe* had bombed Moscow from July 22, 1941. The main targets of these strikes were the Kremlin, the Moscow Hydroelectric Power Station, the City Committee of the Communist Party, military factories and bridges. However, thanks the city's air defence system results were poor. According to the Main Directorate of Civil Air Defence of the NKVD, from 22 July to 22 August, the German aircraft dropped 531 high-explosive bombs on the capital without destroying key targets.

But in autumn, the *Luftwaffe* dropped thousands of high-explosive and 56,620 incendiary bombs. November 1941 saw the highest number of air alerts: over 30 days the air-raid siren sounded 45 times. German bombers hit 5,584 buildings, 90 hospitals, 253 schools and 19 theatres and cultural centres. Bombs struck the Nikitsky Gate, the Grand Kremlin Palace, the Kremlin Armoury, the Central Committee of the Communist Party the Vakhtangov Theatre, the Bolshoi Theatre, the Moscow State University building, factories, airfields and oil depots. During the air raids more than two thousand people were killed and 6,000 were wounded.

The main role in defending Moscow was played by the Local Air Defence (MPVO). Despite maintaining air superiority until December 1941 of the 7,146 aircraft the *Luftwaffe* deployed in the bombing raids only 229 actually penetrated the skies of Moscow during the entire period. Metro stations were used as shelters during both daytime and night-time air raids, becoming a lifeline for

thousands of citizens. A bunker for the High Command was set up at Kirovskaya station. The Underground was a 'city within a city' and on 6 November 1941 Mayakovskaya station hosted Stalin's speech celebrating the anniversary of the Revolution. The day after the Red army paraded on Red Square.

On December 5 the Soviet counteroffensive began and the intensity of air strikes decreased. Axis troops were pushed a hundred kilometres back and the Red army freed the regions of Moscow and Tula. For the *Wehrmacht* it was the first defeat since the beginning of the war. The *blitzkrieg* ended forever.

Demjansk

From January 1942 onward the intensity of air raids on the old and new capitals decreased. The bulk of the *Luftwaffe* was deployed to support ground forces and to strike at communication lines.

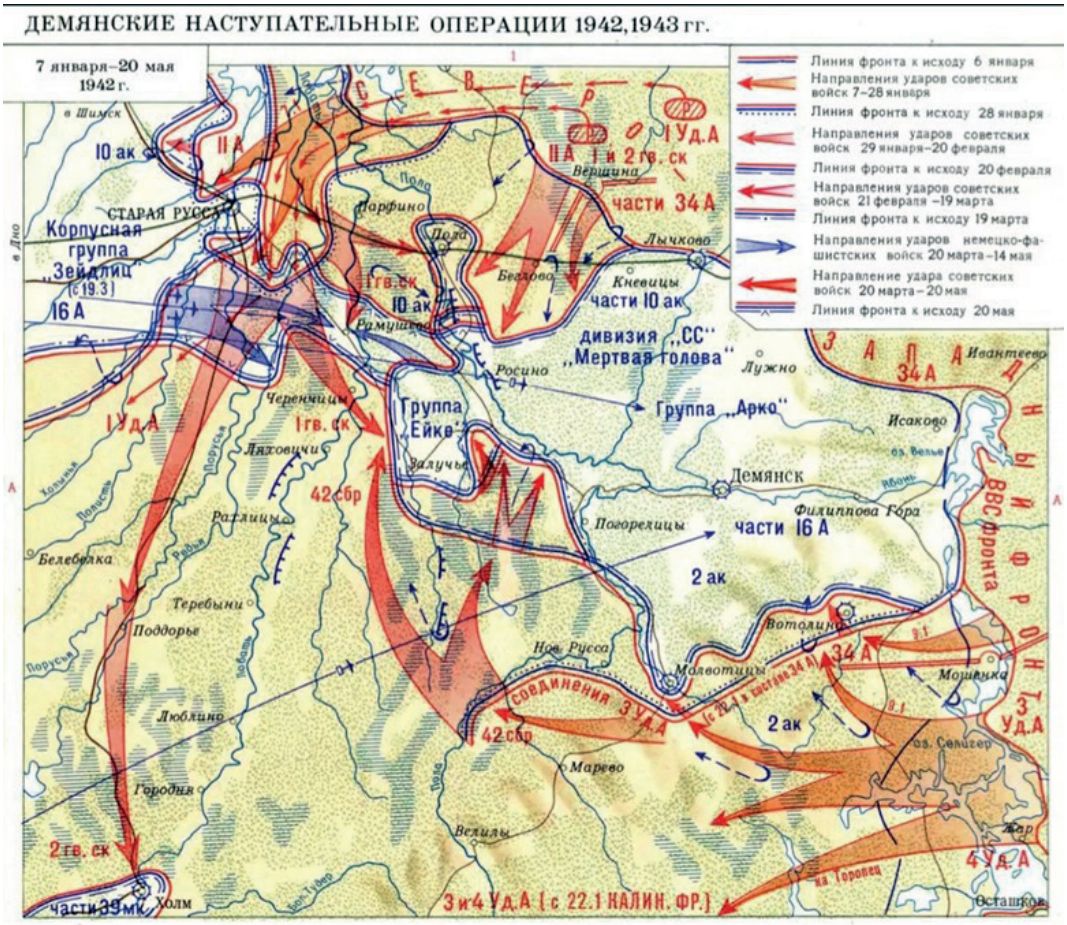
South of Leningrad, near Lake Ilmen, the Red Army surrounded at Demjansk, in the rear of the NorthWestern Front, six divisions of the German 16th Army, numbering approximately 92,000 men and 21,000 horses: the SS *Totenkopf* Motorised Division and the 12th, 30th, 32nd, 123rd and 290th Infantry Divisions.

The 'Transport Aviation Command' (*LuftTransportFuhrer*, LTF), to support the encircled troops, established an 'air bridge' employing all available airplanes of the 1st Air Fleet: two transport groups (the 172nd and the 9th) and military airlift assets (bombers, transport aircraft, and cargo gliders) immediately transferred from other sectors. The management of air supplies to the German troops was led by Colonel F. Morzik, LTF Chief of Staff.

The swift increase in the number of transport aircraft stabilized transport volumes. Whilst 88.2 tonnes of cargo were delivered to the 16th Army on 15 February, the figure rose to 257.9 tonnes on 26 February.[13]

Lasting from January 18, 1942 to February 1, 1943 when German troops under siege evacuated Demjansk, the pocket was supplied with ammunition and food rations. The supply chain provided two-thirds of the daily food ration for

13 Mukhamedzhanov I. R. *Nad Demjanskim kotlom* Voenno – Istorichesky Zhurnal, VIZH 25.08.2015



Map Demjansk 1942-1943

the men and a quarter of the fodder ration for horses, i.e. 300 tonnes of goods to be delivered every day.

This successful air bridge became a teaching example for the *Whermacht* strategists. During the entire period the German air force transported to the airfields within the pocket 64,844 tonnes of cargo and 30,500 personnel. Return flights evacuated 35,400 sick and wounded. From February to May 1942 when land communications were completely cut off the Luftwaffe made 24,303 sorties delivering 15,446 tonnes (an average of 273 tonnes per day) of cargo and evacuating 22,903 wounded.

In the 1942 the struggle of the Soviet fighters against the German airlift was impaired by the Axis air power advantage. Nonetheless, according to German data, supplying the Demyansk pocket the *Luftwaffe* lost 116 aircraft (104 Ju-52s, 10 He-111s and two Ju-86s) and 385 aircrew members, including two group commanders.

Stalingrad

In the summer of 1942 the *Wehrmacht* focused on South Russia and the Caucasus deploying 80% of its forces on the Eastern front to reach the final victory. After seizing the main base of the Black Sea Fleet, Sevastopol, obliterated in June by air raids of the *Fliegerkorps 8* (operation 'Sturgeon Catch') and heavy artillery shelling the Axis launched its summer offensive, codenamed "Blau".

This push included 78 divisions, two million men, and forked into two spearheads. The main part, named "Army Group A" occupied Rostov moving swiftly to the Caucasus and the oil fields of Majkop; "Army Group B", based on the 6th German Army, advanced to the Don and Volga rivers toward Stalingrad, now Volgograd.

On July 17 the 6th German Army clashed with the 62nd Soviet Army on the River Chir: the Battle of Stalingrad begun. The clash of the century lasted more than six months (July 17, 1942 – Febraury 2, 1943) involving millions of soldiers.

General Paulus' 6th Army started the final drive to the city on August 17th, supported by massive air raids. The most concentrated bombing (over 2,000 missions) was launched on August 23, by bombers and dive-bombers of *Luftflotte 4*. Almost 1000 tons of incendiaries were dropped generating a firestorm that destroyed refineries and 90% of the housing stock. Soviet sources estimated around 40,000 civilians were killed in this massive strike. However British historian Richard Overy contests this figure, estimating a number of victims ten times smaller.[14]

All along the first phase of the battle (17.07 - 18.11.42) bombing never ceased, supporting the operations of the 6th Army around and inside the besieged city.

14 *Overy, Richard. The Bombing War Europe 1939-1945. Penguin Books. p. 215*

Meanwhile, Soviet High Command prepared for a counter-offensive, which would envelop the whole group commanded by General Paulus into a large pocket. Deputy Commander in Chief Georgij Zhukov and the new Chief of Staff, Aleksandr Vasilevsky began a secret, massive build-up of forces also known as "Uranus".

The offensive came on November 19th. On November 23rd, the two Soviet spearheads joined hands at the Kalach Bridge. The entire Axis group was caught in a trap: the 6th Army, the 4th Panzer Army and units of the Romanian 3d and 4th Armies, twenty-two divisions with a fighting force of 300.000 men.

To relieve them from the siege, the German High Command planned a "break-in", operation *Winterstorm,* and organised Army Group 'Don', under the command of General von Manstein. While this relief force was being assembled the 6th Army was ordered to hold Stalingrad at all costs, without attempting to break out of the siege.

Hitler ordered that 300 tonnes of fuel, ammunition and food supplies were to be delivered to the Stalingrad area every twenty-four hours. When the decision was taken *Reichsmarschall* Göring, inspired by the Demjansk experience, declared that the 4th Air Fleet could keep Paulus supplied by 'airlift' with 350 to 500 tonnes a day.

By November 1942, the *Luftwaffe* had 878 Ju-52s deployed across all fronts and in the rear. In addition to the Ju-52, He-111s and Ju-86s could also be deployed for transport duties. As of November 20, the *Luftflotte 4* had these aircraft in five transport air groups (5th, 9th, 50th, I./172 and 900th) and two bomber squadrons (27th and 55th), plus one more bomber group flying He-111s (I./KG100 'Wiking').

On 25 November General Paulus received a memorandum by General von Seydlitz-Kurzbach, concerning the 'air bridge' operation. He stressed the differences between the two pockets: in Demjansk, the terrain favoured the defenders and the distance between the encirclement rings was many times smaller. Moreover, the 92.000 men had less needs, due to the absence of motorised and tank divisions.

The requirements of the Stalingrad pocket were estimated at 300,000 litres of

fuel, 200 tonnes of ammunition and 150 tonnes of food per day. The 6th Army was to be supplied with fuel, as well as 20–30 tonnes of armour-piercing shells for 50-mm and 75-mm tank guns and 75-mm anti-tank guns.

The *Luftwaffe* urgently set up large airfields on the Stalingrad route, at Tazinskaya, Morozovsk, Tormosin, and Bogoyavlenskaya. The mass take-offs of German transport aircraft bound for Stalingrad started on November 25. Initially they flew without fighter escort, in small isolated formations and along different routes; they then began flying under escort from ME-109 and ME-110 fighters.

The number of German flights to Stalingrad increased day by day, rising rapidly from 60–70 aircraft a day to 100–150. To allow transport aircraft to land within the encircled area, the city command had prepared five airfields: Bol'shaja Rossoshka, Basargino, Pitomnik, Gumrak, Voroponovo. After unloading the supplies, the aircraft took the wounded and sick on board and returned to their bases of departure.

The operation of the German 'Transport Aviation Command' to supply the encircled 6th Army passed through distinct phases. The first of these lasted from the moment of encirclement until approximately 22–24 December. During this period the initiative was still in the hands of the *Luftwaffe* and the goal was to support Paulus's troops to the extent that this would enable them to survive until the relief force arrived. The peak in transport volumes was reached on December 7. On that day, 326 tonnes of supplies were delivered; return flights evacuated 704 wounded and 32 sacks of mail.

The restoration of the full combat capability of the encircled units was delayed to phases following the break-in. To this end, the Army Group 'Don' planned to route through the breached corridor a huge food convoy carrying essential supplies to the 6th Army (a mechanized convoy of lorries capable of transporting 2,500 tonnes in a single trip was kept ready by von Manstein).

The second phase followed the failure of operation *Winterstorm.* The goal of the German 'Transport Aviation Command' was to buy time by sustaining combat operations within the Stalingrad pocket. However, the implementation of air supply was now determined by the operations schedule of the Red army.

This time the Soviet air force performed a tighter siege than at Demyjansk.

By the end of November, due to the increase in air support, the units of the Don Front and the Stalingrad Front reduced the area occupied by the encircled troops to 1,500 square kilometres, a third of its original size.

In early December the Commander of the Air Force of the Central Military District, General Novikov, devised a more stringent system of aerial blockade to siege the trapped group and repel any attempt to break the pocket. The hunt for military airlift assets was organized on four 'no-fly zones' instructing both fighters and ground forces to destroy enemy transport aircraft both in the air and on their airfields.

The blockade system involved the deployment of radio detection and warning stations around Stalingrad, the organisation of an aerial and artillery siege of enemy airfields within the encircled territory, and the creation, all around the encirclement ring, of four distinct engagement zones for long-range aviation and for the anti-aircraft units of three Fronts (Stalingrad, Don, South-Western).

The first zone, situated along the outer encirclement front, covered the *Luftwaffe* airfields behind the front line. These were to be struck by air and ground attacks and constituted the operational zone for the bombers of the 16th Air Army and, from the end of December, for those of the 8th Air Army and the Long-Range Aviation[15].

Between the outer and inner encirclement fronts – the second zone – operated the fighters of the 8th and 16th Air Armies. This second zone was divided in five sectors – corresponding to the number of air interception divisions – two of which fell within the area under the responsibility of the 16th Air Army. Within the individual sectors, pairs of interceptor fighters patrolled constantly, whilst groups of interceptors and attack aircraft stood ready on the runways, ready to take off on call or on sighting. Each sector had its own radio sighting network operating 24 hours a day and was fully equipped.

The third zone was a corridor around 20 kilometres wide, extending from the encirclement ring all along the perimeter of the pocket. It corresponded to the ground-based fire zone, allocated to the anti-aircraft artillery of the Stalingrad

15 Kozhevnikov M. N., "Komandovanie I Shtab VVS Sovetskoj Armii v VelikojOtechestvennoj vojne 1941- 1945" *(The Command and General Staff of the Soviet Army Air Force in the Great Patriotic War 1941–1945*), Nauka Publishers, Moscow 1977.

Corps Air Defence and the Front anti-aircraft units. It was divided into individual sectors and equipped by December 20 with 235 small-and medium-calibre anti-aircraft guns and 241 machine guns.[16]

The fourth zone corresponded to the whole inner encirclement area. The fighters, bombers and assault aircraft of the 16th and 8th Air Armies operated within it, primarily the 102nd Fighter Division of the Anti Aircraft Defence zone command.

By day, the German airfields were kept under blockade by fighter aircraft; by night, by PO-2 aircraft. As soon as German aircraft lined up on the runways lit for night take-offs, their sentinels in the sky, the PO-2 light bombers, immediately bombed those airfields[17].

The commanders of fighter aviation and artillery maintained constant contact with one another, ensuring coordination. Upon the appearance of enemy aircraft, the anti-aircraft gunners fired several rounds of direct-fire salvos. Guided by the sound of the explosions, the fighters would then begin the pursuit. Together, pilots and anti-aircraft gunners shot down up to 30% of enemy aircraft in flight.

The results of this well-organised cooperation soon became evident. The German supply system functioned less reliably and day by day the 'airlift' became more difficult. From the second half of December, the supply situation suffered catastrophic setbacks. The Red army launched operation "Saturn" and attacked the Morozovskaya and Tatsinskaya airfields. The latter was obliterated through a legendary ground raid by General Badanov's 24th Tank Corps[18].

On December 24, following the collapse of the front on the Chir River, the Luftwaffe was forced to relocate its bases to Zverevo, Shakhty, Kamensk-Shakhtinsky, Novocherkassk, Mechetinskaya, and Salsk.

The failure of the German operation Winterstorm was a death sentence for the 6th Army. As a result of the air blockade the encircled group received a

16 "16a Vozhduzhnaja armij 1942-1945", (*The 16th Air Army* 1942-1945), Moscow, Voenizdat, 1973

17 Id.

18 See: Scotoni G. "L'Armata Rossa e la disfatta italiana: 1942–1943. L'annientamento dell'ARMIR sul Medio e l'Alto Don negli inediti dei comandi sovietici", (*The Red Army and the Italian defeat: 1942–1943. The obliteration of ARMIR on the Middle and Upper Don in the declassified documents of the Soviet Army commands*) Trento, Panorama, 2007

growingly small percentage of supplies through a limited and ineffective airlift. On January 10, 1943, the Soviet offensive to completely liquidate the pocket, codenamed operation "Ring", began. In this final period, the *Luftwaffe* had to withdraw to the airfields in Artemovsk, Gorlovka, Makiivka, and Stalino.

The average distance from the Axis air bases to the 6th Army's landing zones was: 200 km in the first period; 300 km in the second period; 450 km in the last. On average, to fly into the Stalingrad pocket, the planes had to cover about 350 km, including approximately 200–300 km over territory occupied by Soviet troops. At a speed of 190 km/h for the Ju 52 transport aircraft, the flight time was about 2.5 hours, including takeoff and landing time.

On January 17, a powerful Soviet air strike on the Zverevo airfield (north of the town of Shakhty) put this airfield out of action. On the 22nd, Stalingrad's main airfield, Gumrak, was lost. The last emergency airfield, hastily prepared as a backup, was used for only a single day. On 23 January 1943, it too was lost.

Available data illustrates just how catastrophically the 6th Army's air supply fell short of its needs. In total, over 70 days of air supply, Paulus' troops received an average of only 94.16 tons of cargo per day.Between November 25, 1942, and February 2, 1943, German transport aircraft and bombers used for transport purposes flew a total of 6,343 sorties. A total of 6,591 tonnes of cargo was delivered to the Stalingrad including 1,648,000 litres of fuel, 1,122 tonnes of ammunition, and 2,020 tonnes of food. Return flights evacuated 24,910 wounded and sick, as well as 5,150 specialists and many staff officers.

The losses suffered by the German transport aircraft and bombers used as transport assets were high. From November 24, 1942, to February 3, 1943, the *Luftwaffe* lost 488 aircraft. Of these, 166 were shot down, 108 did not return from missions, and 214 were damaged during forced landings. According to Soviet sources, 495 German aircraft were lost during the same period, including: 269 Ju 52s (114 destroyed, 60 missing, 95 crashed); 169 He 111s (28 destroyed, 39 missing, 102 crashed); 42 Ju 86 (20 destroyed, 7 missing, 15 crashed); 9 Fw 200 (2 destroyed, 4 missing, 3 crashed); 5 He 177 (3 destroyed, 2 missing); 1 Ju 290 (1 destroyed).[19]

19 Kozhevnikov M. N., *The Command and General Staff of the Soviet Army Air Force in the Great Patriotic War 1941–1945*, Moscow, Nauka Publishers, 1977.

What lessons did these experiences at the German-Soviet Front teach to the Axis?

The *Wehrmacht* learned that the air dominance in an offensive or proactive way, i.e. the ability to carry out massive bombing and strike operations, far from being a key driver of siegecraft needs to orbit around ground forces.

Looking at both successful and failed defensive operations, the *Luftwaffe* wasted most of its Ju-52 transport fleet in the effort to support the besieged troops in Demiansk and Stalingrad by airlift. Unlike on the European theatres (Norway, the Netherlands, Crete, etc), in the East the Axis air transport machinery was worked to exhaustion.

Conclusions

by Jeremy Black

Built by the Mamluks in the thirteenth century, Palmyra's castle was a tactical location during Syria's recent civil war, and was fought over in 2015-17 by Islamic State and the Syrian army. That is a blunt notice of the continued value of long-built works, which, at the very least, provide firing positions. Linked to this comes the problematic character of the concept of redundancy, whether in purpose, function or form. Indeed, the salience of civil conflict has, more generally, led to the revitalisation of old defensive positions, as in Afghanistan, as well as the use of existing positions as defensive positions. This is a process that has a long history, being seen for example in the English civil wars of 1642-6 and 1648, and, indeed, a process that survived the apparent revolution offered by cannon, for earlier works turned out to be less redundant than anticipated. In Stalingrad in 1942, particular factories provided the Soviets with fortresses against German attack.

This situation underlines the need to see capability with reference to particular contexts, tactical, operational, strategic, geopolitical, social and political; rather than, as more commonly, in more abstract terms of relative technological proficiency. More generally a point of note, indicating the conceptual point about continuity in methods, such a continuity, moreover, is seen in siegecraft. Thus the continued significance of blockade, as opposed to bombardment and/or assault, is particularly apparent.

So also with continuity in the relationship between 'big' and 'small' warfare in both fortification and siegecraft. The general emphasis, and notably so at the popular level, is very much on the former, and on the might accordingly involved on both sides. This emphasis can also be seen in imaginary fiction and especially so in the human/magic interface that is so popular today.

Yet, the reality was very different. Most fortified positions lacked cut-

ting-edge sophistication in their defences as well as scale, not least in their garrison, and many fell rapidly when attacked. Epic sieges were unusual. Linked to that, there is a tendency in some of the discussion of the subject, both past and present, to underplay the significance of the garrison as opposed to the fortifications. Fortresses in part might be a substitute for manpower, and notably so until relief forces could be deployed or success achieved elsewhere. This aspect indeed had tactical, operational and strategic dimensions.

In practice, many plans for fortress design, both for individual fortresses, and for systems as a whole, downplayed or even essentially ignored or downplayed the requirements for garrisons. However, any failure on the part of ensuring the latter destroyed the point of fortifications. Furthermore, both fortifications and garrisons are usually considered by scholars in terms of fire plans, opportunities, and, conversely, vulnerabilities with reference to artillery. In practice, this approach downplays the importance of infantry fire and, the related need in defending positions for troop numbers, and, more particularly, for infantry as well as artillery.

Separately, peacetime planning and wartime practice sometimes underrated the crucial matter of the resupply of a fortress. If this could not be ensured, the fall of the fortress would just be a matter of time, the time it would take for the munitions, water and, to a lesser extent, food-supplies to run out in the fortress. Indeed, a fortress that could not be resupplied would in time transform from a strong shield to a trap. That was the purpose of blockade. It accordingly led to the abandonment or surrender of positions, as with Przemyśl in 1915 and Kut Al Amara in 1916.

Many defended positions, furthermore, were *ad hoc*, as in the anti-invasion defences of World War Two in Britain, Australia, New Zealand and America for example on the British south coast in 1940. Indeed, that was a key element of the fitness for purpose that I repeatedly emphasise in my work, for the need for fortification was often short-term, if not immediate. In part, this was a product of the requirement for protection and for bases at the tactical and operational levels of warfare. Both levels saw a degree of agency and, therefore, need emerge in the equation from the real and potential moves of opponents. From this perspective, field entrenchments, of whatever type, from ‘wagon fortresses’ or ditches, to trenches or lines of sharpened stakes, were the quintessential fortifications.

As a result, moves against them were the central aspect of siegecraft. That situation offers an overlap between battle and siege, which is not the usual approach to either, but one that in practice makes sense of both.

In August 2025, Lithuania outlined plans for a 30 mile deep ribbon of defences intended to deter Russian attack, and part of a system announced in January 2024 designed also to protect Estonia and Latvia. Instead of one wall the intention is to delay invading forces and canalise them into defence areas where it is easier to resist. In 2024, the Baltic states began work on bunkers, ditches and embankments, while Lithuania started establishing stores of 'counter-mobility' tools such as concrete roadblocks and anti-tank barriers. The 2025 plans included the preparation of bridges for demolition, of roadside trees for felling, and the purchase of a large number of anti-tank mines and missiles Lithuania has withdrawn from the Ottawa Convention which prohibits anti-personnel mines.

Very differently in 2025, the Rapid Support Forces, a Sudanese rebel militia, constructed an extensive network of berms, earthen walls, over 31 kilometres long, to blockade the army-held city of El-Fasher in Darfur, thus preventing resupply and trapping civilians. It is unlikely that evidence of this will be present in a millennium.

Fortification as a tactical means is also seen most clearly with shields, armour and, at a larger scale, squares of pikemen, or of infantry with firearms carrying bayonets. That might not appear to equate with the most common understandings of fortification; but nor does discussion of gated communities or modern banks and police stations. Yet, blast-proof walls, toughened glass, barbed wire on walls, and bollards to prevent the approach of car-bombs, have all become commonplace. They are all fortifications, as, somewhat differently are burglar alarms and door and window locks.

In contrast, the classic features of castellation from the late nineteenth century were primarily symbolic, historical and recreational, as with the ruined German castle of Cochem in the Moselle Valley, devastated by the French in 1689, but bought in 1868 by a German steel magnate, Louis Ravené, restored by 1877, and now a major tourist site. Similarly, in the nineteenth century, Brömserburg Castle at nearby Rudesheim on the Rhine was converted for use as a family residence. The Hohenzollern dynasty followed the same at a more dramatic scale in Goslar and at Hohenzollern. At the latter, a new castle was built

in 1846-67, on the site of a castle destroyed in 1423 and its replacement which had decayed in the eighteenth century. So also with the Bavarian Wittelsbachs at Neuschwanstein Castle, and with new neo-Gothic works more generally.

For both troops and buildings, there is now the challenge posed by changing weaponry, notably drones, which, combining artillery, air power and armour, offer attackers range, mobility, firepower and precision at low cost. Pushed into prominence in discussion, usage, doctrine and procurement over the last decade, drones became a particularly deadly form of siegecraft, enabling the ready and rapid assault on defended positions. In an effort to minimise manpower requirements, Israel had constructed an elaborate and sophisticated system of electronic watchtowers, complete with automated machine guns linked to cameras and motion sensors. The Hamas action in 2023 on the defences facing the Gaza Strip, showed, however, that the Israelis had not anticipated the capability of drones to neutralise these positions, often landing on top of them and destroying them with explosives. This was an example of the endless struggle between attack and defence.

Thus, fortification in part has become a matter of protection against drones, with electronic jamming part of the equation, as are anti-drone drones, and the development of weapon sights focused on drones. All were seen in the conflict between Russia and Ukraine that began in 2022. This situation underlines the need to assess fortification in a wideranging fashion and to appreciate its protean and dynamic character. The same is true of the present-day preparations to attack and, conversely, defend Taiwan. Yet, many potential clashes do not see such fortifications, in part because the likelihood is of a missile attack that can hit a range of targets and, indeed, that acquires and demonstrates its potency by means simply of landing. This led to the prominence of the 'Iron Dome' system of missile interception designed to protect Israel, one that was essentially proved effective, at the tactical and operational levels in the 2020s, more especially against Iranian attack in 2025, and therefore was successful at the strategic level. This helped lead to similar pressure for defences elsewhere, for example to protect American targets against possible North Korean missile attack.

The use, during the Russo-Ukrainian war from 2022, of missile attacks, at short, intermediate and long-ranges, further encouraged such discussion, for it was readily apparent that these attacks were capable of creating an impression

of successfully demonstrating vulnerability. The extent to which such operations can be fitted into conventional practices and doctrines of fortification and siege-craft deserves discussion and certainly suggests the need for an understanding of the protean nature of the subject.

Fortification and *Siegecraft*

Fortification and Siegecraft follows others six thematic collections in the Fvcina di Marte series, most recently on Cavalry and Infantry, in offering a global approach to the subject, one that rejects the standards Eurocentricity and, instead, tests chronologies and theories by adopting this wider perspective. Moreover, within Europe, there is a 'decentring' from the standard Western European account in order to devote due attention to Eastern European perspectives.

The interactions of fortification and siegecraft emerge clearly, but so also do the very varied nature of the both and the danger in assuming perfect forms for either. Takes us a long way from standard accounts of walls, castles and citadels toward an approach that also make sense for and from the twenty-first century.

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On the cover:

Henri-Paul Motte (1846-1922). *Richelieu on the Sea Wall of La Rochelle* (1881). Museum of Fine Arts, Boston. In the background, Father Joseph, born François Leclerc du Tremblay, the famous Eminence Grise, studies the technical aspects of the siege indicated by the military engineer

ISBN: 9791298507760